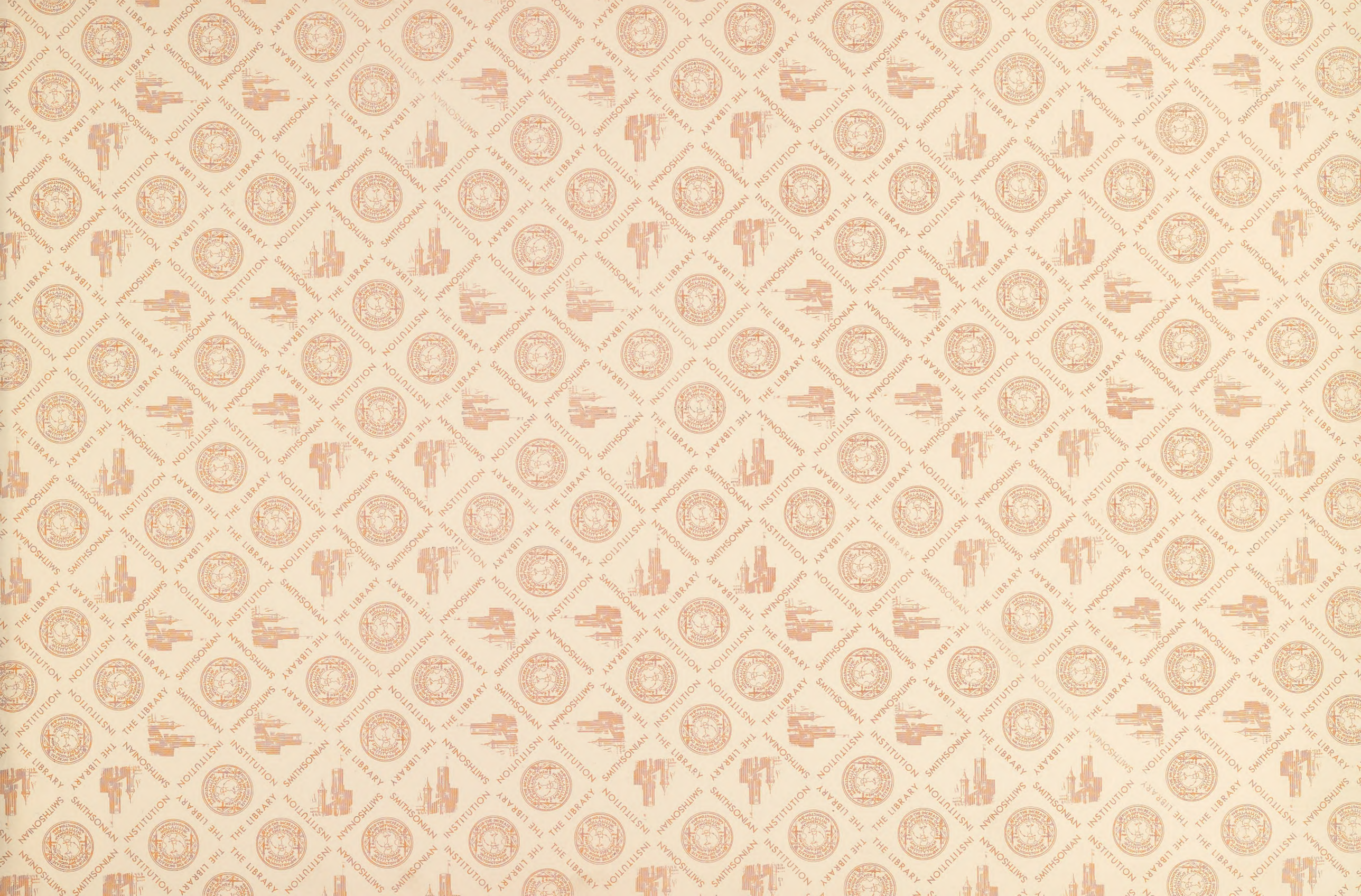

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"Concerning John"
pp. 1—370

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— Ha! — With joke —
"It (the book) reveals in quotations & footnotes that enormous excess of knowledge over the amount of knowledge given out, which reveals the expert." !! from a review of a Cambr: Univ: Press publication.

Baptism:
May 2nd 1792.
John Frederick William
son of Sir Frederick William Herschel
and Mary Herschel
his wife."

Chapter I

"1792 March 7th. John Herschel was bourn (sic)." This terse announcement comes from the diary of Caroline Herschel sister of his celebrated father Dr. William Herschel, in which(most fortunately for his descendants), she kept a detailed account of family events.

Scant news of life in the world around appears in this diary, yet compare the habits of Englishmen at his birth with the civilization of 79 years later at his death. Then appreciate the pioneer work stimulated by the younger Herschel and by his contemporaries. When he came into the world private manners were gross and public manners were savage. Examine Hogarth's pictures or study some of the Prison Reports published after Mrs. Fry's visits to those dens at the end of the 18th century and no one will be surprised to read the following horrid recollection by Lord Campbell, when, as defending barrister, he had unhappily lost his case.x' He wrote: "This client of mine was hung in chains near Stourbridge and I pass him always in travelling from Worcester." Such poor wretches may have been hanged for stealing a lamb or even for stealing a cotton counterpane, whatever it was, hilarious crowds watched their public execution outside the County Gaol. There is nothing to choose between the behaviour of the lowest of these citizens and the ribaldry of the highest in the land, (led by the "College of Princes") Excepting always in the matter of expense, for the simple reason that the coarseness of ignorance ruled all ranks in life.

Let a fellow-feeling give us sympathy with impetuous-minded men who happened to be born in those slow-moving old days and who were steadily retarded by this drag on their thoughts. One of such men was John Herschel. He was like a race-horse harnessed to a plough, throughout his career the overhead weight of monotonous details encumbered his thoughts. Turn to his "Natural Philosophy"*2 and read his heartfelt appreciation of the recent successful work amongst scientists for reducing the slavery of future generations. See his genuine delight in their more accurate instruments, their more exact observations and above all in the more accessible catalogues. Monstrous discomforts and slow methods were his fate and must be heavily underlined in estimating

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x' See "Life of Lord Campbell" {by his daughter the Hon: Mrs Hardcastle.

*2 Published 1831.

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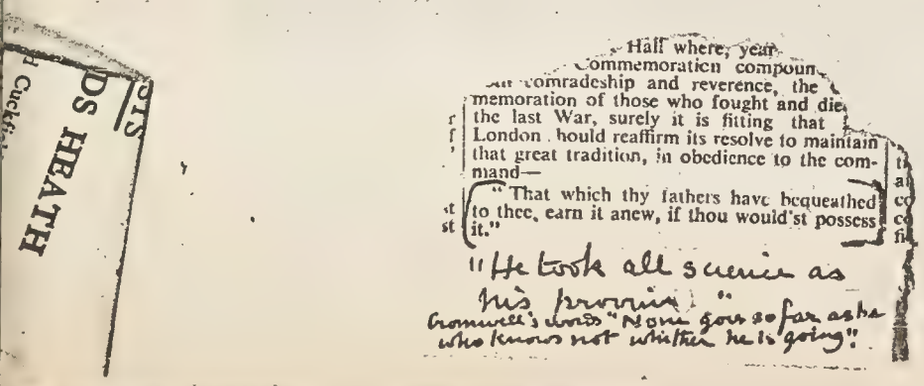
An Historical Sketch.

PREFACE.

This Chronicle is chiefly written for the many great-great grandchildren of Sir John Herschel. At the same time it will be read by his daughters who still take a lively interest in the matter, Sir John's memory and personality is actively present in their minds and it is hard to remember the 60 years which have elapsed since his death. Conditions and events which were commonplace in their youth are thought of as the romance of history by the present generation.

In the 139 years since John Frederic William Herschel's birth more outstanding changes have occurred in scientific and human activities than in any such previous period. The object of this volume is to enable his descendants to form a mental picture of the conditions under which scientists pursued their aims in the years ~~which were producing~~ preceding the mechanical short-cuts ~~that~~ now ~~are~~ indispensible to any considerable progress in human knowledge.

March 1931



the amount of sheer drudgery he endured. No doubt this exhausting toil accounts for much of his ill-health and inability to carry out all the speculations he had proposed for himself in the exuberance of youth. The slowness of transport is another factor to take into consideration and, too, the geographic isolation of England influenced everyone's life in 1792 Recollect that it was a six weeks' voyage under canvas to reach the American States where the Stars and Stripes had only flown for 16 years. Remember also that in March 1792 Louis XVI and Marie Antoinette reigned in France and the Reign of Terror had not yet shamed mankind. Then too France was not yet obsessed by the spectre of Prussia advancing steadily and stealthily from the East, neither had the cyclonic energies of Napoleon swept through Europe. Isolation & drudgery prevailed in England.

In 1792 North-West Europe was an agglomeration of tiny Principalities and Dukedoms amongst which Hanover remained in the hereditary possession of the Kings of England, and it happened from this circumstance that young Herschel's father, William, had long ago been quartered in England for a brief time, a tall fair-haired oboist in the Band of the Hanoverian Guards. Following the rout of the Guards at the battle of Hastenbeck in 1757, he landed again in England with the proverbial 5/- in his pocket, and it is common knowledge that after an arduous musical career he won world-wide ~~universal~~ renown by his discoveries in the realms of science, and that it was George III, the Hanoverian King, who by his large-handed genial interest in the Arts and Sciences provided him and his celebrated sister Caroline with their first directly scientific emoluments.

William Herschel married in 1788 Mary, daughter of Adee Baldwin and widow of John Pitt.×

Adee Baldwin was named after his grandfather, the Revd Nicholas Adee, who in the reign of Charles II appears to have succeeded his brother-in-law in the living of Rodbourne Cheney, Wilts.

Even after the lapse of 250 years his vigorous personality stands out. His portrait in Geneva bands shows a man of big regular heavy features and dark eyebrows and his handwriting on the parchment Registers is masterful (indeed he treated the Parish Register as his private diary for passing events. He noted the dates of the 10 birthdays of his children all together

× sup. 3.

on the fly leaf, and also the fact that at Lyme Regis a friend had been bludgeoned and pressed for a sailor!). He bestowed his daughters suitably amongst the neighbouring squires (vide the Parish Register). But, alas! in 1689 came a tragic ending to his social ambitions. In his own handwriting, firm and black, he made this poignant entry in the Death Register:

"Bayly Adee, the eldest son of Nicholas Adee, Minister of this parish and Margaret his wife, Master of Arts and Fellow[x1] of Wadham College in Oxford was buryed Dec: 9th 1689.- " In this grave he buried all hopes that a son of his would succeed him in the living, for his next son "was bred to the law and practiced in Devizes" and his youngest son farmed his own land in Ampney Crucis.

He ruled the parish for 41 years and as a fiery Jacobite "preached some sermons, which had well-nigh been his ruin."

Four years after his death in 1712, his daughter Grace came back to the village church to be married to Thomas Baldwin of Slough and they named their son Adee.[x1]

[x1 page 2] Footnote John Pitt esqre. of Upton House a member of an old Upton family died in 1786 and their delicate son Paul Adee Pitt died at the age of 17 shortly after the birth of his half-brother, John.

Mrs. Herschel according to an entry in the diary of Madame D'Arblay (Fanny Burney) was good-natured and rich[x2] and she certainly was a fond and doting mother, by no means intellectual but an excellent woman of business. She understood the shock to William's sister caused by his rapid courtship of her and their subsequent marriage. Caroline had hitherto been his closest companion and Mrs. Herschel for her part always tried to be friendly and sympathetic. // It was four years after their marriage that Caroline's diary contains the important news already quoted.

For the first 30 years of John's life the presence of this aunt plays an integral part in his education. She flitted in and out of the premises, a wiry active little figure[x3] still Assistant to his father and still monopolizing all the drudgery of their work, although no longer managing the house for him for their congenial routine ended abruptly in 1788. The marriage unwittingly dealt her a shrewd blow more easily understood if we retrace her early life in Hanover where from early childhood William was always her hero.

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1 x1 Fellow & Sub-Dean of Wadham College.

2 x2 She was about 4 ft. 11 in. in height.

3 x2 Adee Baldwin inherited Widhill Manor & probably soon sold it. Now owned by Lord Radnor

She worshipped him in secret and waited on him in dumb admiration ever since he, a great Guardsman twelve years her senior had won her heart after his return with his regiment from a short duty in England. She had been a chetif, shy, little child of five years old when in 1755 her father and brothers marched off with the Hanoverian Guards to embark for England. The town of Hanover was a pandemonium. The roll of drums, the farewell shouts roared above the din of lumbering waggons and clattering hoofs, the words of command were succeeded by the empty mournful silence: She writes "I found myself now with my mother alone in a room all in confusion, in one corner of which my little brother Dietrich lay in his cradle; my tears flowed like my mother's, but neither of us could speak. I snatched a large handkerchief of my father's from a chair and took a stool to place it at my mother's feet on which I sat down and put into her hands one corner of the handkerchief reserving the opposite one for myself. This little action actually drew a momentary smile into her face."

A year later the Guards tramped home again, and, keyed up to the highest excitement, little Caroline ran alone to the parade-ground to meet them. Poor little 6-year-old, hustled and pushed about amongst crowds of strangers round the barracks, half-crying with disappointment and the fear of missing her father and brother, she hurried in and out of the people, till:

... "at last, when nearly frozen to death I came home and found them all at table. My dear brother William threw down his knife and fork and ran to welcome and crouched down to me which made me forget all my grievances. The rest were so happy .... at seeing one another again, that my absence had never been perceived."

In July 1757, the Duke of Cumberland's "Army of Observation" which included the Hanoverian Guards, was badly routed at Hastenbeck and fell back to Stade. That was no time for a Band, they had to fend for themselves as best they could. The younger musicians straggled home but it was very dangerous for the young man William to be seen about, he would have been pounced upon by their own Hanoverian press-gang in their vague hope that they could stand up against the French army.

For a time he loomed mysteriously in Caroline's childish eyes and he only crept out of their own rooms after dark. One day he vanished entirely and her

at Slough, in the shadow of the huge Herschelian telescope whose great wooden struts and ties were to be seen over the roof of the house by every occupant of stage-coaches lumbering past to Windsor or rattling down the Great Bath Road.[x1]

Slough is a hamlet of the Parish of Upton. The origin of its name is not far to seek, coaches and carriages from time immemorial were sloughed and delayed for repairs in the swampy ground near Montem.

The house where young Herschel was born lies off the Great Bath Road on the way to Windsor. In 1792 it was a small ivy-covered house with stables and out-houses, surrounded by cornfields and pastures which sloped down to the flood-meadows at Eton. Beyond the river rises Windsor Castle, clear-cut in all its massive dignity against the Southern sky. In those days the little John could always see if he scrambled up the mound inside his garden or even better if he was winched up with the observer's gallery 30 ft. above the ground in the frame-work of his father's telescope. Here he stood, himself a King on his own Castle!

The garden is surrounded by a high wall within which towered the huge structure of the 40 ft. telescope, dwarfing the house, the workshop and a crowd of workmen constantly busy on the orders which Dr. Herschel had in hand. A small son in such a pre-occupied household soon invents his own distractions. Or sometimes his nurse carried him up the road to see his Aunt who describes in high delight how he came running across her room shouting, "Show me the Whale, Auntie, show me the Whale!" and she would fetch out her Flamstead's Star Catalogue and open it at the terrific picture of "Cetus" gnashing horrible whale-bone teeth.[x2]

One day in that garden when John was hardly three years old, his Aunt Caroline watched and "saw him lay the corner-stone to the building his father added to the house at Slough"; afterwards she discovered him trying to pull the lowest stones out of a wall, where perhaps he hoped to find another corner-stone. He soon was running busily about with the workmen, for his proud Aunt overheard a carpenter cry out in admiration: "Dang the boy! if he can't drive a nail as well as we."

No suitable playmates lived near him in Slough (later on, his holiday companion was his cousin, Sophia Baldwin),[ϕ3] in fact he had a solitary childhood

[x1] It was a landmark in the earlier Ordnance Surveys.

[x2] This book, yellow and cocked with age, still lies on the shelf at Observatory House, Slough.

[ϕ3] Sophia Baldwin, born 1784, married Th. Beckwith 1819, d. 1821.

affectionate little soul mourned his loss. Where had he gone? Eventually he slipped across to England. After 7 more years he returned for a visit to Hanover and joy reigned in her heart till on a Sunday he drove off again at the very time appointed for this Lutheran maiden, dressed in her black silk and artificial flowers to receive her First Communion. Her distraction of mind became intolerable, through the open door of the Church she heard the coach-horn and the wheels rattling away over the cobble-stones, bearing from her this brother, the centre of all her affection and leaving her again to a self-chosen loneliness. Worse still, the little girl recovered from small-pox only to be warned that no one would ask her in marriage because of the pock-marks so she had better prepare to earn her living. What a careless thing to say to a child! It encouraged her morbid reserve in a not-too-sympathetic surrounding and release only came when in 1772 her brother re-appeared from England and offered to take her back with him as a soprano voice in his concerts and to manage his house for him in Bath. Now for sixteen years the hours were one long joy spent with her brother, and spent for her brother, in an endless companionship. The very simplicity of her outlook was its own undoing for in 1788, when William married quite unexpectedly, Caroline had to readjust her life in Slough. She was a stranger with no acquaintances except for an old Hanoverian friend in the Court at Windsor;[x1] Her work being still necessary to her brother, she took lodgings in the village.[x2] It is distressing to find how much spiritual loneliness dominated the remaining 60 years of her life, giving a certain asperity to her naturally gentle and unworldly spirit. A search through her Diary gives the clue to her bewilderment.[x3]

However, her dry whimsical humour and a capacity for a detached contemplation of her own life saved the situation. She transferred her maternal study of William to his son John, born four years after the marriage. Accordingly, as is only fitting, the great date in that household is announced by his Aunt.

William Herschel was on the high plateau of his fame when his only child John Frederic William was born[x4]

[x2] She changed her lodging frequently, her longest stay being with the tenant of Upton House.

[x1] Frau ... Beckedorf. [x3] See also Memoirs of Caroline Herschel by Mrs John Herschel. (wife of Colonel John Herschel R.E. F.R.S.)

[x4] His christening in St Laurence Upton took place on 1792. His godparents were Sir W. Watson, General Komerzuslin, Jun White.

His father's garden was always liable to invasions of workmen or parties of visitors with whom he mingled with interest and propriety and so felt no need for companions of his own age. These important or celebrated visitors engaged much of the time and attention of his elders and John helped even in his very early years to show people the great "Forty-Foot".[x1]

There were sufficient exciting operations for a small boy going on at home. In one workshop he might find his extremely skilful Uncle Alexander doing a bit of turning on the cumbersome foot-lathe or busy at another bench cutting a brassfitting for an instrument. At the farthest end of the walled garden was the foundry which could reveal a glorious sight, flames and flying sparks, where sweating men hammered at the glowing metal whilst boys no older than himself pulled the rope for the bellows. Or, if he was led by his mother for a walk through the twisting lane to see his Aunt at Upton (and to inspect Upton Farm on the way) they had to pass before several narrow, low, thatched barns where his father's carpenters worked at the wooden parts of the long telescope-tubes and frameworks.

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x[1] Jan.3, 1798. Mr. Bertie Greatheed of Guy's Cliffe, Warwick, remembers:

"Our nice little friend Johnny." And

Dr. Burney mentions: "Herschel's comical

little son."

x[2] Destroyed in 1932.

* He may probably watched his father shaking hair-powder in the air, before a mirror for an experiment on diffraction. (See WH. Phil Trans: 1807) (& JFWH Opt 58 for similar sights)

busily happy in his own ways and copying his amusements from the activities around him.* His mother was busy about her household and social duties and the affairs of her Upton Farm, and his father and his Aunt Caroline were absorbed in their astronomical work often turning daytime into night. Whilst they slept no running feet or romping games could be tolerated.

The family affections circled anxiously round the child. In fact Mrs. Herschel became oversolicitous to keep him from the children of toadies and sycophants hanging round the Regent and the Court at Windsor.[x1] As a result he played with no one, but of course her motherly care bowed before plans arranged by Fraülein Beckedorf for him to go to the Castle[x2] to be seen by the Queen. Later in life one of his schoolfellows[x3] said of him "He never was a child, he hadn't played with other boys or joined in other children's games." This tended to a self-centred precocious mind filled with lively thoughts of a strong imagination.

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x[1] (J.F.W.H. to Chas. Babbage, 1814). "The worst part (of Slough) is the society, which owing to the vicinity of the Court is, in general, peculiarly unpleasant."

x[2] Extract from Mrs. Herschel's Diary, Jan.9th 1796. "My son was introduced to the Queen and Princesses by Miss Beckedorf. The Princess Elizabeth gave him a China cup and saucer which she desired him to keep for her sake, which I hope he will live to show his children's children, for as long a I live I will take care of it for him."

1796 Ap.23rd (St.George's Day).
My son changed his dress and was taken to the Queen and Princesses. Princess Elizabeth gave him a small box to keep sugar-plums in, which I have carefully put with his China cup and saucer given him before by Princess Elizabeth.

x[3] John Grettan, so. of the Dean of Hereford. q.v.

Those years

Miss Herschel's notes of ~~her nephew's boyhood~~ give us invaluable knowledge of his schooldays, she wrote them 40 years later in Hanover. Few events escapedher memory, the intense preoccupation in her subject insures fresh and accurate details.

According to her "Biographical Notes", John Herschel's education began in earnest when he was about six years old: "In 1797 he was at School by Mr.Aitkins,came home Sundays and others to receive instruction by Teachers in writing, Arithmetic, Music, Geography, etc." -

He went on from this little school to Mr. Bull's at Newbury where he developed the pugnacity[x'] which eventually cut short his time at Eton College.

"May 1st 1800. Fetched my nephew ... and took him to his Boarding Dame, Mrs. Howard at Eton."

Memoir: 1800. "About this time he was at Eton, but I cannot exactly remember how long he remained there, but this I remember that when his Mother in riding through Eton, saw him stript and boxing with a great boy, it was thought best to take him home, for his health was but delicate in the early part of his life, having had the misfortune to be nursed by a Woman who died soon after in a decline."[x2]

Dr. Herschel promptly replaced Eton College by quite a different sort of school at Hitcham. This village lies not five miles from home in the high wooded country near Burnham catching a distant view of the Castle across the low lands of Upton and Eton. The Incumbent, Dr. Grettan, late Fellow of Trinity College, Cambridge, took pupils at Hitcham House and there John Herschel remained till 1809 when he went up to Cambridge with an Exhibition. For short intervals during that period Dr. Herschel supplemented Dr. Grettan's tuition, the boy went to Mr. Luscombe's[x3] at Clewer during 1804 and had special tutors in 1806 and 1807.[x4]

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x' Letter from J.F.W.H. at Newbury to his Mother, Nov.28 1799: "It is three weeks today to our holidays. My head is quite healed."

x2 Letter to Dr. Herschel from Mr. Bertie Greatheed: Nov. 1800: "I was very happy to hear so good account of your nice boy whom I was perfectly sure, as I think I told you, you would not keep long at Eton, that seat of vapid lounging."

x3 Afterwards Master of Hertford School. see p.14.

x4 Mrs. Herschel's Calender 1807. "Mr.Hausman gave my Son his first German lesson. Had one dozen."

(Continued on next page)

Work was always in progress and his Father was the active directing genius of the whole place[x'] never weary, never finding any detail too trivial to be dealt with personally. Equally 'au fait' with the mechanical problems of his workshop or the scientific problems of his study.

In fact, for a keenly intelligent, highly-strung child, there was almost too much going on. He need never stop and probably never did stop. He might think and watch and speculate and ask questions all day long, indeed it is exceedingly probable that his quick-witted eager thoughts were cultivated in all directions by his adoring Aunt and everyone else. Children were encouraged beyond their strength in those days. In later life John Herschel frequently deplored his own headlong impulsive way of plunging into the sea of knowledge, the subsequent exhaustion taught him nothing, his boyish enthusiasm for knowledge never diminished in spite of an old age[x4] haunted by bronchitis and rheumatism.

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x' See Childe Harold, (Canto III 36) Byron (referring to Napoleon)

"Whose spirit,-antithetically mixt-
One moment on the mightiest, and again
On little objects, with like firmness fixt."

x2 Extract from Life of Sir H E Roscoe.

"After my lecture at the Royal Institute was over I went to an evening party at Mr. Hardcastle's (June 1, 1866) who was then Member for Bury St.Edmund's and a connection by marriage of the Herschels, to meet Sir John Herschel whom I had never seen. I found the great astronomer who was only a year younger than Faraday (Herschel was born in 1792, Faraday in 1791) in perfect possession of his faculties and the contrast between the two intellects, the one dying out, and the other still in full vigour was brought home to me still further by a conversation I had with Herschel. I mentioned to him a fact which I had just learnt which I knew would interest him. This was that ..... Joseph Boxendell the well-known Manchester astronomer had observed that a new star .....had suddenly burst out and become a star of the first or second magnitude. Herschel was very much interested of course in this observation of the Nova which was new to him and remarked "do you know that when I was at the Cape I observed a similar phenomenon?" Then, considering for a while "Yes, it was in the year 1835" and again after a pause, "On Aug.16th at one o'clock in the morning".

(Sir H. E. Roscoe's Life).

A glance at the coloured print[x4] "Dedicated to the Nobility and Gentry educated at Hitcham House", shows an old red brick house where school-boys in the foreground dressed in knee-breeches and blue tail-coats run about after hoops. It was here that Aunt Caroline Herschel spent an outstanding day:

July 14th, 1806. "I spent one happy day at Hitcham, my three brothers were present and my Nephew surprised us all."

By special invitation she drove over to the School with Mrs. Herschel, Dr. Herschel and the uncles Alexander and Diedrich, "to hear the Speeches of Dr. Grettan's Scholars. Beginning with a Lecture of Opticks by the following, Grettan, Crackinthorpe and Herschel. Cicero, etc., by Herschel."

Next year owing to the absence of his Father, she promoted her nephew to do the honours of the sky to some visiting Royalty:

"At our return from Cumberland Lodge, we found the Duke of Kent with the Duke of Orleanse (sic) etc. waiting for us and my nephew and myself shewed them Jupiter, the Moon etc. in the 7ft."

But a marked feature in his education was the annual tour of his parents to distant parts of England. This was Dr. Herschel's summer holiday when they travelled post in their own chariot, and while they bumped & rumbled over the stones or when they chose to turn out at a wayside village during the change of horses, John had many more opportunities than most small sons to catch up information from his Father's comments on men and matters. He was only eight and a half when he was first promoted to the summer outing for sea-bathing at Ramsgate[x5] making it a 'partie carrée' with his cousin Sophie. , By bad luck, he caught chickenpox at that fashionable resort.

Note[x4] from preceding page continued:

Biographical Memoir. Sep.20, 1806. "Mr. Rogers from Edinburgh arrived at Slough, engaged as Mathematical Instructor to my Nephew, who at the same time continued his studies at Dr. Grettan, going to Hitcham several days in the week till Oct.20,1809 he went to Cambridge." John Herschel was sufficiently attached to Mr Rogers to call on him at Leith when travelling near there in 1811.

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x[3] Letter from Mrs. Herschel to C.L.H. referring to the summer plans: July 27th, 1800: "We have fixed for going to Ramsgate for a month. John and my niece will go with us ... I thank God he is quite well, but as rude as ever." (Did she expect a little boy of 8 to behave like a girl?)

x[4] Always hanging in J.W.H's dressing-room.

However, the next year John saw his Father's old haunts at Bath and they sauntered with all the visitors in Sydney Gardens. After which Dr. Herschel wrote to Caroline saying: "We shewed John a French puppet show. It was very well done." Thence they drove through Glastonbury, past Wearyall Hill & past Exeter, to make a long stay with Sir William[x1] and Lady Watson at Dawlish and to combine the pleasures of this visit with sea-air for the young people.

These long drives were not wholly wearisome. We know John and his cousin picked up a good deal of curious geological information[x2] for his father wrote up in his Diary the stratification of the passing countryside.

E.G. Round Blandford: "the hills are chalk and flint in general ... the flint shew evident signs of having been on a seashore."

John was barely 9 when he first copied this watchful habit over new roads. He retained the trick all his life and accumulated a vastly promiscuous set of notes in his Diaries.

In 1801 they explored North Wales. In the previous tour they chiefly studied the workshops of Nature, this year the party inspected commercial workshops. They drove to Worcester and saw [illegible], the delicate productions of the China Works in the making, thence to the crash and glare of James Watt's iron foundry at Soho and to the Coalbrook Works before trotting steadily north in the silence of mountain gorges as far as Conway Castle.

Dr. Herschel's Diary this year contains chiefly terse, businesslike notes on mileage, names of inns and prices, only here and there yielding to the natural beauties of the district: "Saw a beautiful turn of the river Glynn among the rocks where it falls down into a deep open place."

Near Conway: "The whole of the road is by the side of stupenduous (sic) rocks and mountains."

But architecture receives little attention beyond the bare entry: "Ludlow Castle", "Tewkesbury Abbey". Dr. Herschel shows more interest in long stages and

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x[1] Sir W. Herschel's earliest friend. Son of the Physician of George III.

x[2] Based on the Plutonian theory then in vogue.

? Neptunian

"Sunday Aug. 8th. We breakfasted with Madame Laplace to take leave."

Later in the day Dr. Herschel dined alone with the Minister of the Interior[x'] (M. Chaptal) who then drove him to Malmaison for his introduction to the First Consul.

Their return passage on Aug. 15 was no more fortunate than the outward one. On arrival at Dover Dr. Herschel at once wrote to his sister and added:

... "It is difficult to pass over such a painful thing as seasickness without talking of it. John desires me to write the following lines as you have honoured him with the title of "poet" and called upon him for letting you know of our arrival:

'Our fears are over
We are at Dover.'

Sent with no comment, he merely added: "You will be so good as to send John's poetry to Bath."

Dr. Herschel seldom expressed an opinion on the boy, but once he did so to Dr. Grettan. More than sixty years later, a schoolfellow, Professor Renouard,[x2] wrote of it to John, in his "anecdotage":

"I told Dr. Grettan that (when mounted up aloft opposite to my desk at Hitcham and apparently studying your lesson) if I looked that way you seemed to be gazing about but yet, on trial, was always first in your class, (all I believe nearly 3 years older than you and some, such as Gordon, no blockheads.) He said: "Yes, I have observed the same and noticed it to his father, Dr. Herschel, whose remark was: 'He is like me, we have two souls, the working-soul and the play-soul, when one is at work the other is always asleep.'"

Two years later Dr Herschel had his son painted. The boy in this picture, completed during 1804, has the large dreamy dark-blue eyes noticeable in all his portraits. He stands pensive, holding his hoop, and gazes at the spectator with an enquiring trustful expression. This gently thoughtful look of self-possession was characteristic in later life though, even as a child, he was extraordinarily lively in thought with considerable toughness of body.

John and his parents, with Cousin Sophie, drove round the South Coast in 1805. At Portsmouth whilst in testing the endurance of his 9 year old son, (as to which his last entry sounds satisfactory, "55 miles in a month").

Their memorable Continental Tour and the interview with Napoleon was in the next summer. The Treaty of Amiens was signed in March 1802 and by May 1803 hostilities began again but Dr. Herschel's characteristic promptitude[x'] in crossing to Paris that summer saved him from being interned in France for the next 11 years in company with about 10,000 English folk trapped in France by the renewal of the war.

They coached down to Dover where they had to wait three days for a favourable wind so the little boy got a sight of a ship being launched down the slips. At last, the sailing packet "Active" Captain Hamilton decided to start, fair or foul, and they made a boistrous passage in three hours, described by Dr.Herschel in a letter to his sister:

... "The Ship was greatly exposed to the waves ... Mrs. Herschel was extremely frightened and very ill ... John Herschel was also very sick, I laid flat upon the ground on deck and did not stir, tho' a great deal of water dashed over me."

William Herschel was soon involved in Paris by a crowded list of engagements with all the foremost philosophers of the day, La Place, Berthollet, Count Rumford, etc., but he made time to take his party to a meeting of the Institut and in letters to Miss Herschel he told of most of their doings:

"We all dined with Madame Gautier at Passi (sic). It is a beautiful place and there was a very elegant entertainment."

Aug.2. "We saw the Jardin des Plantes, Museum of French Monuments, Temple, the place where the Bastille has been. In the evening to one of the Gardens."

On the Saturday General Komarzewski,[x] godfather of John Herschel took them to the Louvre where an 'appartement' had been given to: "M. Charles, the Aeronaut and Lecturer. He has a very magnificent apparatus for experiments in natural philosophy. We dined with the General at the Gardens of the Thuilleries and he spent the evening with us."

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x' See Chronicles etc. by Lady Lubbock. Beg., Laplace had received the Portfolio of Minister of the Interior on 18 Brumaire- 9 Nov. 1799.

x2 Professor Renouard, Chair of Arabic Cambridge. Letter April 28th 1865.

x' Caroline Herschel's Memoir: "My brother was always so uncommon precipitate."

x General Komarzewski, Godfather to J.F.W.H. probably killed in 1807. See Visitors Book, Slough: "1814 Sept 13. General Comte de Pac buried Genl Komarzewski at Paris 1807." A note added in handwriting ? William Herschel. Comte de PAE.

and endurance over the stony roads so full of deep ruts and awkward places plaintively described by Mrs. Herschel.

The first fixture was Guy's Cliffe near Warwick to visit Mr. Bertie Greatheed[x1]. Oxford merely served as a stage for the horses and provided a "walk in the Physic Gardens" for the party, whilst from Woodstock Mrs. Herschel writes that they walk "once more in that most delightful and beautiful Park at Blenham, the evening was most charming and the scenery of the whole of that grand domane beautiful. I have not the power to describe it."

These were the days before Macadam took over the conditioning of high-roads and by the time they got out of the carriage at Shipston-on-Stour they had walked up and down hills, which the road abounded in to such purpose that Mrs. Herschel was far too tired to join her son and niece in their evening walk round the town. Next morning they were off in the carriage and drove under the gateway of Guy's Cliffe late on the evening of Saturday.

"We were received with all that kindness and hospitality which marks the character of the dear owners of that delightful mansion" and nothing would content Mr. Greatheed till they consented to remain till Tuesday. Among the party of friends arranged to meet them were "Mrs. Parry"[x2] from Bath and Mr. and Mrs. Wilmot, her son and daughter."

At Guy's Cliffe John Herschel was introduced to the home life of a cultured gentleman who had travelled much and who delighted in describing dramatic situations. Clearly it was a revelation to the younger man. Mrs. Herschel was able to note with vast gratification: "I never saw my son so happy as he was when in company with Mr. Greatheed, indeed it would be impossible to be in company with such a charming man without improvement."

Re-action set in when they had left Guy's Cliffe: "Our first stage to Coventry we could talk of little else but the pleasure we had derived in the society of such elegant and well-informed people." By the time they halted at Coventry, John was so out of tune with commonplace life and petty manufacturing towns that she was fain to add: "At Coventry my son took such

x[1] Bertie Greatheed 1759-1826. s of Samuel Greathed & Lady Mary Bertie. Made prisoner in Paris when hostilities broke out again in 1803. He had a narrow escape from being amongst the détenus in Verdun; but obtained permission to travel anywhere on the Continent but not to return to England. His only son died at Vicenza in 1804. See "Farington Diary."

x[2] Mother of the celebrated Arctic explorer, Capt E. Parry R.N.

standing about in the shipbuilding yards "We saw a mast brought out" and later his father pointed out the machine for making blocks for ships, invented recently by Brunel[x1]."

Then, after Chichester, they drove up Arundel's narrow steep street to Brighton and, turning northwards, through Cuckfield and the forests of Sussex to Reigate heading for London and so home.

In 1806 they put John into the Newbury stage-coach; He was going to his godmother at Shaw to fish for trout in the Kennet whilst his parents went to Soho to see the marvellous new "inflammable air" lighting the works of Boulton and Watt. The two following years they all went again to Brighton and Bath taking new roads and exploring different villages from the previous occasions.

John's health was very indifferent during the springs of 1808 and 1809, his Aunt Caroline observes in her Diary: "Some sort of infectious influenza was apparently about for I found my Nephew ill with an inflammatory sore throat and fever" and again next year: "January. My nephew, a sore throat and fever." His Mother's jottings for 1809 include a very long bill from Dr. Pope and a note that John had "Visions", presumably in connection with fever, indeed later in the year they almost had to turn back from their proposed Tour to the North because John was taken ill before they reached even Oxford.

For the northern tour in 1809 we open Mrs. Herschel's green leather diary. Seen through this window, the whole length of England passes before the observant eyes of a woman gifted with sound practical sense. She constantly desires a pen more able than her own to describe the strange sights.

As for John, this summer holiday lay between his school days and his coming new life at Cambridge. In this 'Grand Tour' of the northern counties Dr. Herschel showed him the places of his own "Wanderjahre."

The family party, including their niece Sophia Baldwin, packed into their travelling chaise[x2] from the door at Slough at 8 o'clock on Wednesday July 12th, 1809. They took their own coachman and their own pair of horses the whole way, a fine test of skill

x[1] Sir Mark Isambard Brunel invented it in 1803.

x Residence of his Uncle Alexander.

x[2] Or perhaps it was his father's "chariot" which [illegible] states he sold in Long Acre for £7.10 in 1852. ! JFWH

Mrs Herschel now gives This is contemporary evidence of how the War in Spain affected life in England.

It was the week before the Battle of Talavera. Society ladies preferred to remain at home to snatch at snuff-box gossip from the coffee-houses and talk over rumours slowly trickling through from the Peninsula to London.

Local gossip however shocked Mrs. Herschel for she soon heard that Mr. Arkwright had "£100,000 a year, too much for any one man", but she was pacified when she found that the Church which they attended on Sunday "was built by the late Sir Richard Arkwright for the benefit of the nighbourhood at his own expince."

From Matlock they plodded north through hilly Derbyshire to visit Mr. George Augustus Lee in Manchester, the manufacturer who had adapted the so-called 'burning-gas' for use at his works. In passing, Mrs. Herschel mentioned that: "Buxton is well worth seeing if you are within a few miles, but I should not go many miles out of my way to see it, unless I should have any of those disorders that the waters are prescribed for and then I should, like the rest of the world, go there in hopes of getting well". As for company, again there was none, and what there is, is chiefly invalids. An evening at whist cheered up the elders, for Mrs. Herschel has a note, "John and Sophy lost 2 rubbers" at Bullock Smithy.

The family and the family carriage suffered sorely in the approach to Manchester. For 20 miles round the town the roads being stone-paved. "Like in France" as Mrs. Herschel herself remembered.

Most unfortunately Mr. Lee was away from home but "the servant show'd us the way in which the gas-lights are made use of, his whole house is lighted up with these as well as his manufactury,[x'] which is the largest in Manchester, (he employs more than a thousand people)."

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x' "At the cotton manufactury of Philips and Lee ... the introduction of this species of light ... has been gradual ... At first some inconvenience was experienced from the smell of the unconsumed ... gas ... The peculiar softness and clearness of this light with its almost unvarying intensity has brought it into great favour with the work-people. And its being free from the inconvenience and danger resulting from the sparks and frequent snuffing of candles is a circumstance of material importance."

William Murdoch. Phil: Trans: 1808.

a dislike to the town that we could not persuade him to leave the Inn". There he stayed in the Inn parlour to dream dreams and see visions inspired by all the wonders of Guy's Cliffe, whilst Dr. Herschel gallantly conducted the ladies up and down "the badly paved streets" to see the "ribon manufacturies and the two churches."

The horses being rested they rumbled on northwards for two days "over indifferent roads" reaching Derby just in time to dine and then pay a ceremonial call upon Mr. William Strutt[x'] "where we drank tea." He was the well-known owner of silk mills, cotton mills and china works "they constantly employ 3,000 people". They were invited to see over the works.

"My son and niece had never seen anything of the kind before, they were much delighted."

Indeed they saw them most thoroughly. From 10 o'clock until 2, they trudged enthusiastically round the silk, the cotton and the china works, they scrutinized every detail until even John Herschel was obliged to confess that: "twisting and reducing the thread in size here becomes too complex to be understood perfectly in the very few moments we could stay".[x2]

After a "hasty dinner" they drove off to Matlock: "Just a mile and a half before you reach the Baths you have to descend the steepest hill I ever walked down".[x3] "Very little company here, nor has there been much this summer".

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x' Mr. William Strutt ... (here a short biography)

x2 A few short notes about Derby in John's own diary of this tour which escaped his wholesale destructions in later life. He observed that the silk-mills were still worked by a wooden water-wheel. "The cotton-works are extremely beautiful on account of the elegant machinery employed", which fascinating steam machinery he illustrated by neat Indian-ink diagrams.

These notes have a family resemblance to his father's earlier journals but, whereas John was delighted by these labour-saving devices as intellectual triumphs in the solving of a problem, it is clear that William Herschel's more practical mind seized at once on the improvement in the resulting work.

x3 Locally named "Matlock Bank."

of these mountains, the many lakes ("we have seen 6 of the principal ones") and the countless waterfalls enraptured her, but she was so conscious of inability to describe, that she dared only say of that last stage into Keswick: "eight miles never to be forgotten for the beautiful scenery, for the description of which I must refer my friends to the Guide. The view into Keswick from the top of a very high hill which you descend into the Town is charming, you have a view of the Keswick Vale which is thought by all travellers to be the finest, you see the Derwentwater lying just before you, never can I forget the beauty of this scene, I shall ever remember it with pleasure."

Whilst ~~Whilst~~ the ~~horses~~ baiting the horses ~~baited~~ under the foot of Helvelyn "my son had the pleasure to ascend that fine mountain which Scott immortalized..."

Before starting away from Keswick, Mrs. Herschel says somewhat wistfully:

"Dr. Herschel, my son and niece went to the top of Skiddaw on horseback, the ascent to the top is 5 miles; they were attended to the top by a proper Guide, I was too much of a coward to go ... they were not disappointed in their expectations for the view was more grand and sublime than it was possible to imagine. We are now (Penrith) at the farthest point of our journey and to-morrow morning shall bid Adieu to Cumberland, a county I shall never see again. 325 miles from Slough.

Saturday, August ye 5th. This morning we were told by the waiter that the House had been in danger of being burnt down by the carelessness of a Gentleman leaving a Candle burning in the Coffee room among the newspapers on the table, all the books and papers were burnt to ashes. My Son and Niece slept very near the Coffee room and we have to thank a kind providence in saving all our lives. It was some time before we could recover our fright, in consequence it was late before we left Penrith."

Yet in spite of many stoppages to ease the horses up and down hills: ("the road so very hilly I walked half-way") they made 20 miles to Brough. Unfortunately they found themselves for the last day in the Lakes, there condemned to spend the whole of Sunday Aug. 6th, huddled over the Inn fire whilst the rain poured down outside.

How a fortnight hung on their hands before their

As for Manchester itself "I hope never to see it again. The manufacturies are without number and I am sure so are the inhabitants, I never saw so many people together in the streets except in Paris. We walked to see Mr. Lee, whose house is more than a mile from our inn, the whole way was nothing but dirty narrow lanes and streets and so crowded with people it was with difficulty we could get along. In going out of the town one of the pins that supports the carriage broke and let the body of the carriage fall down which of course frightened us extremely, fortunately Dr.Herschel was walking by the side of us, to get proper information for us to take the right road[x'] ... we had immediate assistance and in about half an hour all was right again and we was once more jumbled the next stage ... the road all the way paved for more than 20 miles, that I may truly say never were 4 people so completely tired as we were when we arrived at Chorley, a stage of 11 miles. I thank God we were all well but Sophie, the shaking of the road gave her such a violent pain in the head that as soon as we came into the Inn she went to bed. I walked with my Son into the Town."

Hilly, badly-kept roads took them on through Preston to Lancaster where from John o'Gaunt's Chair at the top of the Castle comes the first glimpse of the sea.

Westmoreland received them true to its reputation. Mrs. Herschel's diary says they drove: "a most gloomy road over a mountainous heath up and down hills the whole way. It rain'd all day. I got completely wet from walking up and down the hills." But then came the vivid contrast: "We were amply repaid for our trouble, about a mile before we reached the Inn at the foot of the beautiful Lake of Windermere, I can with truth say, all I have seen here far surpasses whatever I have seen before."

Mrs. Herschel never trusted herself to write a description of scenery nor did architectural wonders impress her very much. At home, the great mass of Windsor Castle defined a wide extent of her daily horizon, they passed no secular building to equal it in any way. A few sentences are forced from her by the striking contrast between this rugged country and her placid pasture lands at Slough, the prospect

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x' See p.55 Chap.II

pens than mine and therefore I shall only say that going 200 miles on purpose would well repay the trouble of such a journey."

Lingering about this "charming spot", they only arrived at Harrogate at about 7 o'clock. "After calling at all the Inns we were taken in at last at the "Hope," we was not well pleased with our accommodation but such as we could get we were obliged to put up with. The Crown Inn, the house we wished to be at, in Lower Harrogate was so full it was impossible to be there."

"On Saturday evening we went to the Theatre to see the comedy of 'Laugh when you can' with 'The Blind Boy'. We had very good singing by Corri's pupils from York, the whole of the evening went off very well. On Sunday we went to Harrogate Chapel where we heard a very good sermon from a young gentleman, we supposed it was his first sermon, and in the evening drank tea with friends staying at the Crown Inn."

Because they could not be taken in at the Crown, they had a week to spare and decided on seeing Scarborough. They splashed off, doing the first stage to York over loose, stony roads and through pouring rain. On arrival, the evening cleared up and Dr. Herschel, with his niece, walked out to call upon their friend Mrs. Wolley a relative of Mr. Wormald* of Leeds. Next day, early, she returned the call and did the honours of York Minster and the Assembly Room: "Which is thought a very fine one" wrote Mrs. Herschel, "but for my own part I thought nothing of it after seeing the Rooms at Bath."

Cross-country lanes onwards from York to Scarborough prove very trying. "We reached Scarborough tired to death with the jolting of the carriage, which must be strong, for nothing broke belonging to it, tho' we was fearful of it the whole of the way from York which is 40 miles. We may think ourselves in high luck to be taken in at all, as our stay is to be but two or three days and we find noone will let their lodgings for less than a week." That evening they whiled away the time at "'The Comedy of Man and Wife, or, More Secrets than One', the whole went off much better than we expected, so that we returned to our Inn much pleased. Saw both the Spas, the one is a mineral, the other a strong purgative, one runs from the North, the other from the South." But not a word about the sea!

* Senior partner of Wormald & Gott see p. 22.

engagement at Leeds with Mr. Gott* the great cloth manufacturer, so they started off for a week at Harrogate.

"The road very beautiful all day, our horses much tired", but by a great push of 31 miles the carriage reached Richmond, "in the evening, it was quite dark, so that we could see nothing. In the morning when I looked out of our chamber window I was quite charmed with the appearance of the town, which is built on the side of a Hill commanding a most beautiful prospect of a romantic country for miles around." Strangely enough she does not mention the ruins of the Castle straight in front of her eyes.

After breakfast these conscientious sight-seers casting round for a local attraction, heard that a Yorkshire Toxophilite Club was holding its Annual Meeting. Leaving Dr. Herschel at the Inn, the others bustled off to the Ground two miles away. "The Silver Arrow was won by the Rev. Mr. Blackburn who shoots with his left hand." Taking the Castle for granted she mentions that "there is another ruin called a monastery, it makes a fine appearance as you enter the town." Accordingly after dinner the active young people walked another two miles to see Easeby Abbey whilst Mrs. Herschel "much fatigued with my walk in the morning" remained with her husband.

Next day the 25 miles to Masham took a cross-road so stony "that it was enough to break the carriage in pieces."

They counted on sleeping at the Unicorn, Ripon, on Aug. 10th. Though the day began well by a leisurely visit to Hackfall and its cascades, a Thursday being Market-day seems a most unfortunate date for any unannounced travellers to arrive at Ripon, (the Square already full of a crowd that swayed and jostled to and fro.) "We found the Inn so full that after dinner we was obliged to set in our bedroom to tea, it rained and thundered and lightened all night." In spite of the mob of people and carts they pushed their way to the Minster before dark for they made an early start next morning.

Just outside Ripon they drew up to inspect Studley. "The beautiful seat of Miss Lawrence is the finest I have ever seen. It has been described by more able

x Mr. Gott (Wormald)

about 100 miles of the indifferent hilly roads that led through Doncaster,[x'] Grantham and Stamford. With their usual bad luck they hit off a Market Day at Grantham. They wanted to get off early, but Mrs. Herschel could not resist going round the stalls before they drove off: "On our return from Market the carriage was waiting for us with Dr. Herschel within" so quickly handing up their fairing, (a pair of stockings) to the coachman they got under weigh.

At Witham Common where they stopped to bait and dine, Mrs. Herschel as a practical farmer was vastly interested in a "thrashing machine on the best construction; it was worked by 4 horses and "could grind out more corn in one day than could be done by 6 men in a week, and I think it is a sin that every Parish in the Kingdom has not one, which would be sufficient for the use of all farmers in such a parish as Upton, for a few hours would thrash out a load of wheat."[*]

At Stamford where they lay for two nights: "We heard a very fine sermon preached by the Rev. Mr. Atley, private tutor to Lord Exeter's sons, the singing was good and I may say with truth that I have not heard the Service of the Church more devoutly administered than in this Church." Afterwards, they roamed about the Park and gardens of Burleigh House, planning out their next stages so as to be able to reach Cambridge with a final stage of ten miles, (after passing through the camp of 8000 French prisoners at Normand (sic) Cross Barracks.) By this means they reached Cambridge in good time and drove in to "the Inn opposite Trinity College; and after dinner we saw several of the Colleges, the first, of course, was St.John's where I had the pleasure to introduce my Dear Son for the first time. In the evening we saw Mr. Hornbuckel (sic) my son's Tutor, he gave us a

x' "They are now building a grand stand on their race ground, we saw it on the road, it is nearly finished and a most noble building it will be when it is done. ... At Scarthing Moor we were entertained with a goldfinch in a cage kept in motion by a black figure which every time the bird hoped (sic) the Cage was turned round by the figure."

[*] Riots. See W. Cobbett.

[ß] Thos. W. Hornbuckle. 3rd Wrangler 1797, Mod. 1805: visited Dr. Herschel at Slough on July 29th 1808 (see Visitors' Book) and on Aug.2nd 1808 the name of the younger Herschel as "a Pensioner" at St.John's College Cambridge appears on the Records.

On Sunday, they turned back through York (coming in for the end of the sermon in the Minster), slept at Tadcaster and, by a very early start next day, hammered along as far as Leeds, throwing in Kirkstall Abbey en route.

On Tuesday, Market Day, a punctilious call upon the ladies from Mr. Wormald, senior partner, which preceded the arrival, hat in hand, of Mr. Gott, junior partner, who waited upon them to show them "all the wonders of their manufacturies, from the wool taken from the sheep's back to the cloth fit to make up. We were more than 3 hours looking at all the machinery. I wish it was in my power to give the least description of what I saw, but that is impossible, for to describe the powers of a steam-engine requires a more able pen than mine."

If John's mother was dazed and bewildered by the noise and movements of these novel machines, John himself was not. In his diary he eagerly entered every detail from dyeing the raw wool to putting a nap on the finished cloth, and moreover thoroughly enjoyed seeing a workman's impromptu joke at a vat:

"The course of the steam is regulated to a nicety by a stopcock, which either stops at once the boiling of the liquor or admits so large a quantity of steam as (if the operator pleases) to throw the whole out of the vat, with a thundering explosion, forming a large cascade of boiling water mixed with a roaring column of steam fifteen or 20 feet high and one of the grandest spectacles imaginable!"

This long day ended in a jolting drive of 15 miles bouncing in and out of holes and ruts and over stones to Pontefract.[x]

John's weary comments on the uncomfortable Inn; "it was late; it was dark; the place unprepossessing; the Castle a "shapeless mass of ruins," pointedly hint that this evening he was at the end of his tether from nervous exhaustion, (his lifelong handicap.)

Mrs. Herschel, on the other hand, looked forward intensely to their first arrival with John in Cambridge. During the next week they intended driving there over

x Note in John's diary: "This is correctly pronounced Pomfret."

An Historical Sketch.

PREFACE. to rewrite.

This Chronicle is chiefly written for the many great-great grandchildren of Sir John Herschel. At the same time it will be read by his daughters who still take a lively interest in the matter, Sir John's memory and personality is actively present in their minds and it is hard to remember the 60 years which have elapsed since his death. Conditions and events which were commonplace in their youth are thought of as the romance of history by the present generation. omit

In the 139 years since John Frederic William Herschel's birth more outstanding changes have occurred in scientific and human activities than in any such previous period. The object of this volume is to enable his descendants to form a mental picture of the conditions under which scientists pursued their aims in the years which were producing mechanical short-cuts that now are indispensible to any considerable progress in human knowledge.

The style in which it is written is intended to harmonize with the slower pace of events in the days of John Herschel's life.

very pressing invitation to dine with him the next day, which we with pleasure accepted and a most agreeable day it was to the whole party which consisted of just a dozen of his friends with Mr. and Mrs. Innes and son, who is just entered at St.John's, (this young gentleman was with Dr. Grettan at the latter part of my son's being with Dr. Grettan) I spent all my spare time in seeking after lodgings for myself when I return with my son, we found great difficulty in getting any, as they are nearly all engaged for the students who cannot be in the different Colleges. My son has been particularly fortunate in getting rooms next to Mr. Hornbuckle's, it is owing entirely to his great kindness that he is so well accomodated for Mr. Innes's son could not get such good rooms but was obliged to have them in one of the small Towers. On Thursday morning we were obliged to sally forth again in search of lodgings in which we succeeded. They are not such as we wished to get, but such as they are we must be thankful for. They consist of 1 sitting room, two bed-rooms, a servant's room and the use of the kitchen. The Landlord is to lend everything but linen and plate at £4. 4. a wk. We are to enter on them the 18th Oct."

Having satisfactorily arranged accommodation for herself whilst she settled John into his College rooms next Term, she is all haste to get back to Slough, Hertford being too far to reach that afternoon, they slept at Royston and arrived with just enough daylight left to find the way under ground to "the cave lately discovered, supposed to have been made by a lady in the year 1170 for Religious purposes." [Annandoville]

At Hertford they had friends. "Mr. Luscomb the Headmaster of the famous School was tutor to my Son."[x1] His wife invited the travellers to breakfast and they "passed two hours with them most agreeably their attention to us was very flattering." Finally by sleeping at Rickmansworth contrived to arrive home in time for dinner on Sunday:

"Thus ended the most delightful tour that ever was taken by four people. We travelled 789 miles without any accident worth mentioning and all of us returned home in perfect health.[x2] This journey we shall ever reflect on with great pleasure."

about Aug 27th

[x1] See page 9.

[x2] It may be of interest to note that Sir Herschel was 71 that year and Mrs Herschel was 59. John was 17 & Sophia Baldwin 25.

Chapter II

College Life.

Safely back in her home and refreshed by the adventures of the summer Mrs Herschel directed all her energies to launch John in College. The way was paved, she had taken lodgings for herself and Sophie in Cambridge and on October 14th 1809 the exodus began. Dr. Herschel went as far as Kensington with his wife and son to be joined there by Cousin Sophie, and next morning at 7 a.m. saw them into a chaise from Kensington for Cambridge. They arrived at 5 o'clock and Sophie wrote off blithely to her sister: "Having breakfasted and dined on the road we thought nothing of the journey."

From Cambridge the news came back to Kensington that:

"Our young student staid with us one night and the next day equipped with trencher cap and sable gown took possession of his rooms, dined in Hall and for the first time slept under the roof of St.John's; he likes his new mode of life exceedingly."x'

The younger Herschel's entry into University life coincided with the Jubilee of George III. All Cambridge awoke on his first Sunday to the re-echoing jangle of bells ringing from 15 Parish Churches and the firing of feux de joie. A sermon was preached before all the members of the University, the military attended in brilliant state, and the poor of Cambridge had a feast.

"It was a sight that did one's heart good and when our good King's health was drunk with 3 times 3, all standing sung 'God save the King'. It really was almost too much..... On Sunday we drank tea with John after seeing them all in Chapel with their surplices which was a fine sight."x2

His Aunt Caroline sums up the break with school and enumerates his qualifications for College, Taking his exceptional grounding in the more scientific subjects as a matter of course, she reckons up also with

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x' Extracts from Sophia Baldwin's letters.

x2 From Sophia Baldwin's letter.

some pride his progress in the Arts as follows:

"1809. Oct.14. The whole family went to town. Oct.17. My brother returned. My nephew went to Cambridge ..... At the time of his going to Cambridge he was a good poet (see his versification of Psalm 137) a good pianoforte player, afterwards an excellent flute. Drawing, I heard Hauptmann Müller[x1a] wishing to have but one of John's talents, viz: that of Drawing. German, and I suppose the French languages, had not been neglected for I know he took lessons in the former by Mr. Hausman."x'

Though Mrs. Herschel was pleased that her son's rooms at St.John's should be next his Tutor's, as for other advantages, they had none. K3 in the second Court, where young Herschel 'kept', is on the ground floor where the sun cannot penetrate. The back window tucked away behind the angle of a buttress green with moss, opens on to a dank corner of the third and last Court.x2 In and out of those rooms Mrs. Herschel busied herself, her niece reported:

"My Aunt has been of so much use arranging for John's furniture, that it was certainly well she came."x3

Eventually Mrs. Herschel went home leaving John a Founder's Scholar and free to "enjoy his new mode of life exceedingly", though thanks to her affectionate leading-strings and all this careful forestalling of his need she was forced to confess to Charles Babbage several years later that John had no experience in business matters.

The first Term ended and the undergraduate came home, but (though no longer a schoolboy,) in the Long Vacation of 1810 he relapsed into his boyish habits and as usual stepped dutifully into the family carriage behind his Mother, Cousin Sophie and Dr. Herschel, for a long drive to Glasgow, there to celebrate Dr.Herschel's Honorary Degree at the University, but it was not destined to be another triumph for their stables. Their own pair broke down, the young horse bought specially for the journey went lame almost at once and their

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x' Extract from Miss Caroline Herschel's Memoir.

x2 The Bridge of Sighs, and the Fourth Court across the river, only began building in 1825.

x3 From Sophia Baldwin's letter

x1a Possibly the painter of John's portrait ("by Müller") in 1804.

shall have heard from Mr. Clarkson[x'] (who was a Cambridge man I believe) to whom he means to write requesting his advice as to what College I should attend. .... About your meditations upon the heroine of your last epistle, how differently do similar circumstances affect different men. More enraged than grieved at the loss of your Nymph, you can return to your Studies with more alacrity than ever - but for me I am scarcely able to open a book. The idea of the darling of my heart haunts me wherever I go ... but I know it would amuse you more were I to tell you that I see your friend Walter Scott[x''] limping about every day through the streets."

Grahame entered St.John's but did not stay the course, whilst for the next three years John Herschel forced himself to conform to the routine of reading for Mathematical Honours.[x2] Babbage's scornful opinion was that the practical teaching in the English Universities consisted in applying oneself to some portion of the "Principia" of Newton or to some other writer on mathematics according to the Synthetic Method. This task even the future Senior Wrangler had to study day and night, he had to commit it to memory as a child does his lesson so as to be able to answer readily to a certain set of questions.[x3] "At last, the ardour which at first had been kindled by curiosity was extinguished by disappointment and the energy which would have enabled him to attempt some original investigation became finally destroyed."[x3]

In fact, a reform in method was long overdue. The aspiring Bachelor still obtained his status by public arguments in the Schools and he underwent two public Disputations or Opponences[x4] during the year previous to his Tripos.[x5]

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x' Thomas Clarkson 1760-1846. Was a member of St.John's Coll: Cambridge. Later on famous as one of the Founders of the Anti-Slavery Soc: 1823 etc. with Wilberforce & Buxton.

x'' Sir Walter Scott 1771-1832. Had a club-foot

x2 To his father: "The impatience with which I look forward to the termination of this childish course of subjects is inconceivable." re Tripos work.

x3 "Pages from the Life of a Philosopher" by C.Babbage.

x4 See Letter J.F.W.H. to W.H. Feb.1812. on p37

x5 The Tripos derives its name from mediaeval days. The Candidate sat at the feet of "Mr. Proctor" on a three-legged stool and was comically called "Mr.Tripos." He disputed orally with a Senior Questionist. In due

(Note continued on next page)

coachman had the mortification of riding the pair back whilst his masters continued the journey stage by stage with postillions and posthorses. They stayed with Jas Watt at Soho on their way North and eventually reached Whitehall near Glasgow the home of Mr. Robert Grahame, Writer to the Signet, on July 31st.

John Herschel's Diary states:

"Arrived at Whitehall, we found ourselves instantly at home. Here is none of that ceremonious politeness which torments the host at the same time that it oppresses the guests but its place is occupied by an easy and most amiable hospitality.

Aug.1st. Walked down to Glasgow (to see sawmills, circular saws, weaving house) where the looms are worked by steam-engine ..... The evening concluded with the most rational of amusements, that of entertaining and social conversation with very little help from those destroyers of time, cards."*

Aug.7th. "This morning Mr. James Grahame roused me at 7 o'cl. and we walked to the Aqueduct Bridge (and saw) Nelson's Monument 140 ft. high (during a violent storm on Sunday it was shivered by lightening.) It is a stone obelisk the top of which for near 6 ft. down is rent open curiously and the whole shaft is split.

Aug.9th. (The Observatory dinner) Dr. Herschel's health was drunk with 3 times 3. "After staying to hear his reply, Mr. James Grahame, who sat next to me, proposed leaving this astronomical party and going in search of the stars themselves. These were no less than the ladies!"

No doubt also they slipped away from this prosy banquet because the two young fellows wanted to talk. Their mutual attraction was immediate and ardent and in fact soon after the Herschels had posted back to England, James Grahame wrote in great excitement to John about going to the University:

"I am anxious to get to Cambridge as soon as possible, will you be so kind as to write me particulars respecting St.John's. But my father wishes that I shall form no determinatiin on the subject till he

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x' In 1866 Professor A.S.Herschel wrote: "Whitehall, from being in the country is now part of the town (Glasgow) and is numbered 249 Dake Street. I could not get to see the rooms which are no doubt very handsome ones like the house and grounds."

* cp J. Grahame to J.F.W.H. 6th August 1812. "Are you at Slough overlooking with cynical aspect a party at Whist?"

J.F.W.H. to his father.

"St.John's Coll. Camb.
1811. Oct.4.

"We all have our troubles in this life. You have been pestered with a comet-struck multitude[x'] crowding like cocknies at the annual stag-hunt to join in this wild-goose-chase (fox-chase, I should say, as the 'brush' seems the principal object of attraction.) I have not escaped without my share. All the daily duty of the College during this last week has unfortunately fallen upon my shoulders. Reading in Chapel fourteen times a week, reading grace 4 times a day to the Fellows, writing Latin declamations and spouting them in full conclave for the good of the public and to crown all, when I had just got through all and was enjoying the thoughts of being free during the rest of the term, a Fellow, with a grin upon his countenance, meets me with the agreeable intelligence that I was to write a copy of verses to send to the Marquis of Salisbury.[x2] This nearly overcame my patience and I took for my subject; "What hath man of all his labours and of the vexation of his heart wherein he hath laboured under the Sun?" ..... We begin to look back upon our travels[x3] as things long past and it seems rather strange to fancy oneself at Nottingham or Penriston, or Airdrie or any of the places only once visited. It was a long time, however, that I could so far recover from the good effects of a whole summer of dissipation (shall I call it?) as to read with any effect and if it were not for the solitary fortnight I have spent, I do not know whether I should ever have set to in earnest again. I cannot quite imitate your example in returning to my usual and regular employment with all diligence immediately after so complete a vacation. But I endeavour."

Another letter to his Father whilst he was piously reading the specified subjects for the Tripos shows his impatience at the routine.

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x' Comet of 1811.

No. Duke of Gloucester elected Chan. Oct 3. 1811.

x2 Chancellor of the University.

x3 The double attraction of James Grahame and Glasgow Observatory had drawn them into a second tour to Scotland in 1811. Dr. Herschel's Diary for 1811 tells us:

"The young folly went to the top of Helvellin. The day before, they sailed upon the lake ... and

(Note continued on next page)

The week of the final examination was still conducted in exact conformity to ancient precedent.[x4] The Questionists were considered as a separate body and collected at a separate table in Hall. The Moderators were provided each with a set of questions in manuscript. On the Monday at 8 a.m. all the Honours men were received by the "Father of the College" at breakfast in Combination Room and thence marched to the Senate House.

"The hours were sharp, the season (January) a cold one and no fire was allowed in the Senate House whilst the Examination was carried on, and altogether it was a severe time. The hours were 8 a.m. to 9 a.m. written paper. 9.30 to 11 and 1 to 3 p.m. oral. The Examiner read from his M.S. the first question. Those who could do it wrote out their answers, and as soon as one had finished he gave the word "Done!" and the second was read out and so on separately for each cry. The evening papers 6 p.m. to 9 were conducted in the private College-rooms of the Moderator, wine and cakes were offered to the examinees".[x5]

Only Scholars were competent to become Fellows of Colleges. In Hall the Scholars dined apart, in a peaceful oasis surrounded by the noisy tables of non-reading men. The food was roughly served yet all the men were required to change from the drab small-clothes still obligatory in the morning, into white silk waistcoats, black breeches and stockings for Hall. Wigs were never worn by the younger men, they went out of fashion after the French Revolution and though Sir William Herschel continued the practice his son wore his own thick mass of natural curls somewhat "à la D'Orsay".

As a Scholar of his College [illegible] certain official duties [illegible] in due course devolved on John Herschel. [illegible] He dashed off a letter to his old father sure of his sympathy in the worries of these sublunary details:

(Note from preceding page continued:)
time humorous "Tripos" verses began to be circulated among the listening Fellows, then through an idle habit the Moderator often used the back of one of these sheets to note down the order of merit of the Honours-men and sent it out to be posted up somewhere. Thus the results of the written Examination began to be called the "Tripos" list.

x' See Whittaker's Letter p.48 of this book.

x1a H.R. Luard (14th Wrangler, 1847) says "when he came up ... the Statutes of Elizabeth were still in force & the only subject which obtained official recognition was that of Mathematics." see "Old Friends at Cambridge & Elsewhere" by J. Willis Clark.

delightfully engaged without producing any of those perturbations which destroy her peace." Pray remember me to the Mathematician when you write next," and later he writes, "delighted at having seen the printed questions set to the Candidates and also with John's observations and quotations from De La Place's 'Systeme du Monde'".

In the meantime John dismissed further thoughts of the viva voce in Mathematics(acquired according to the Synthetic Method) by printing two articles in Nicholson's Journal for February 1812.

His first published paper "Analytical Formulae" [x1] shows that besides steadily getting the "Principia" by heart he had ventured off the straight and narrow path of duty and tempted by his College friends had studied the continental methods and helped to give early publicity to a system which through the prodigious energies of himself and other choice spirits calling themselves the "Analytical Society" very soon ousted the lengthy processes of the English school.

Herschel's friends at Cambridge were among the reading set or from the men he had known before he came up and though class distinctions in 1809 and the stiff bounds of University etiquette limited an undergraduate's choice it remains a truism that a man's friends form the background which reveals his character.

Foremost of all stands James Grahame, a Scot of somewhat cadaverous features, whose hereditary principles encouraged Herschel's love of justice and fair play. He was the son of Robert Grahame, Provost of Glasgow, "a uniform friend of liberty", who early instilled that spirit into his boy by giving him as his first teacher, a French émigré priest. Then too, his grandfather, President of the Admiralty Court at Glasgow, was the

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x' In 1831 John Herschel himself enlarged on this point of view: See J.F.W.H's "Natural Philosophy" p. 10. "The question 'cui bono' is one which the speculative philosopher can seldom hear without a sense of humiliation. He feels there is a lofty and disinterested place in his speculations which ought to exempt them from such questioning, communicating as they do to his own mind the purest happiness and tending to the injury of no one (and) he has only to point to the history of all science (to prove that) speculations apparently the most unprofitable have almost invariably been those from which the greatest practical applications have emanated."

x² Op. 1. 1812.

1812. Feb. 5. St. John's College. To his Father.

"My dear Father,

If I can avoid writing latin after a fortnight's habit of writing nothing else I will send you in plain English an account of a most formidable ceremony which I have just been obliged to submit to. To say the truth, during the last week, I have been thinking of nothing else, and yesterday was my Black Monday.[x1] For a fortnight before I had been stuffing my memory full of all the algebraical formulae I could lay hold on, to thunder them forth with Ciceronian eloquence. But when the time came, my courage became faint, and decreased gradually as it grew nearer. At length the dreadful sounds: 'Adsurgat, dominus respondens' summoned me to the rostrum, where I was badgered and baited with fifty-one syllogisms against me and a Geometrical Moderator (infandum renovare dolorem) for about three hours, when the good gentleman was so kind as to dismiss me with a flaming compliment. I think I may safely say that I did not the whole time know a word I had said a minute ago what with the eyes of half the University fixed on one and my own head spinning like a top. However, thank Heaven, it is over, I have indeed another to come but that is far distant.[x2] Now it is time to dismiss this, for these things though very terrible to the unfortunate being who is subjected to them yet in reality are but a mere farce in themselves....."

His father could not resist forwarding this description and a batch of John's letters to his old crony Sir W. Watson keenly watching the dawn of his godson's career, whilst taking the waters at Bath. In his acknowledgment he said: "Many thanks to you for the perusal of my excellent Godson's letters. I am quite delighted with them and not more so for the good sense they abound with, than for the good humour and happy disposition of mind which they display..... For no study, I believe, is so gratifying to the person who pursues it as the Mathematics... it is an occupation in which the mind is

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Note continued from preceding page.
and after breakfast walked soberly to the margin of the lake.with Mrs. Herschel. The rest of our party are again upon the lake."
At Newcastle: "We saw the comet through the 14 ft. telescope"-"Taken for the journey: £400."
Whitehall was again their headquarters for excursions, not only to Glasgow Observatory, but to the picturesque wilds of Scotland.

x' His first "Act".

x² The "2nd Act" took place a few weeks before the Tripos.

first Judge to decree the liberation of a negro slave brought into Great Britain. [Before Lord Mansfield.]

James abandoned Glasgow University in 1811, feeling impelled to enter St.John's College, Cambridge, by a sudden friendship for young Herschel, but he cut short that Cambridge career two years later by his early marriage.x1 Thereafter, at his wife's death, he voluntarily gave up her West Indian estates which flourished on slave-labour, and thus sacrificed a fortune to his principles. He became Writer to the Signet and practised at the Scottish Bar besides producing an excellent History of the U.S.A. (now out of print). From 1828 until his death in 1842 the state of his health obliged him to live in France, where he married again.

His warm heart successfully dispelled a mist-screen of reserve behind which Herschel systematically concealed his emotions, beyond this chilly air Grahame found loyal friendship and the delicate sympathy which remained his to the end. Almost alone amongst Herschel's personal friends he could say: "We have been the friends of each other's soul and of each other's virtues. Many a day we passed in walking together, many a night in studying together..."x1 After Grahame's death, John Herschel formed no new friendships; on the contrary, like his favourite rainbow, he faded elusively through the throng of those who sought his society in public life. A rigid sense of Truth maintained in his home-life gave him no hint for dealing with the debased standard of public conduct then predominant. He shrank from before its contact.

In another friend, a strong contrast with the lantern-jawed Grahame, we see the square-faced pugnacious features of Charles Babbage, a Devonian, son of Benjamin Babbage, a banker, and possessed of a very different temperament from the Scot. Though Babbage was a Trinity man, Herschel, the Johnian, attracted him through their mutual dislike of current methods of teaching mathematics at Cambridge.

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x' His daughter, Matilda, by his first wife, eventually married Herschel's young brother-in-law, John Stewart.

x² When Grahame suddenly engaged himself to be married in 1812 he never forgot how Herschel impulsively posted to Huntingdon at midnight from Cambridge to waylay the Scotch mail and wish Grahame good luck in those few minutes whilst the coach changed horses. (3 Jan. 1819).

Babbage

He arrived at the University an impatient and most opinionated young man, for, on account of delicacy, he only received a spasmodic education as a boy, lacking in discipline. He taught himself algebra, became full of enthusiasm for mathematics and in his own home read Ditton's "Fluxions", Woodhouse's "Principles", and "Lagrange's "Théorie", consequently found himself uncomfortably ahead of the men of his own year when he went up to Trinity, and chafed at the bonds which he considered confined our young English mathematicians. lack of early training in perseverance was here his undoing. Where J. Herschel had steeled himself against the inevitable drudgery, Babbage bought La Croix's greater work in 1811 and was lost! Knowing this, he declined to enter for his degree in 1813, being certain that he would be beaten by his friend.

However, he came up again next year, entered at Peterhouse and rioted through the Senatehouse, ending as "Captain of the Gulph" (i.e. top of the unclassed men). Within another six months, he was a married man and enquiring about housing accommodation at Slough. Herschel and Babbage maintained a lifelong correspondence, Babbage in a sprawling fist on huge sheets of paper dilating on his Calculating Machine and all and sundry, Herschel writing with rapid flow of thought in straight line after straight line and yet with an enthusiastic flourish in the caligraphy and signature.

Babbage occupied the Lucasian Chair for eleven years x² without delivering a single lecture. He eventually died within a month of his friend. Strangely enough, owing to Grahame's meteoric course through the University these mutual friends of Herschel never met till many years had elapsed and Babbage was in quest of a permanent University position at Edinburgh.

Whilst Babbage cut capers and wasted his force on side issues quite taboo if a man meant to get through in Honours, Herschel found time in the summer of 1812 to write a paper x' in the old fashioned lines and sent it up to the Royal Society where it appeared in Phil: Trans: for 1813. It established his position as a rising mathematician. The Royal Society took the earliest opportunity to elect him amongst their Fellows thus

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x' "A Remarkable Application of Cotes' Theorem." Op. 3. cp. Sir H. Davy P.R.S. Presidential Address 1821.

x² 1828–1839. See Camb: Univ: Calendar.

reviving and to a seat beside his Father. He had just reached his 21st year.[x] This paper soberly developed on the surface of his mind but his 'twin-soul'(as his Father had named it)seethed with more ideas than he could commit to paper. He scribbled off a letter to Babbage blazing with excitement:

"July 1st, 1812.

Citizen,

Your letter of the 20th has reached me. I rejoice to find that you are still labouring in the cause of reason and truth. To speak in the language of mortals, I am glad to see that you now are reading analytics - in the retirement of a vacation. I too have been down. Newton was my companion. I had vowed to peruse his 2nd vol. His 2nd vol. however returned unopened with me. Alas! Alas! I was stringing one functional equation after another, with un-cramming delight ..... Like a dog that has stolen a bone and cannot find a hiding place for it, or a talkative woman with a secret on her tongue's end. I have been choking for these last ten days with a dozen or two analytical results which I have thus been compelled to disgorge on all whom I meet like Horace's mad poet: Quem cunque arripuit tenet occiditque legendo.....Thus you see the style in which I am reading for the Senate-House. However I intend to lead a new life and become regenerate and, washing myself in the waters of the Lethe, be born again in the Spirit of Geometry. God convert you to this doctrine.

I remain, Citizen,
Yours sincerely,
(sd.) Herschel.

P.S. For Heaven's sake bring up something with you for the Analytical Society, for we must open dashingly."

This Analytical Society is a novelty in Cambridge and Herschel's casual allusion needs explanation. About three months previously the Society germinated in the brains of a few really earnest undergraduates. They had privately dipped into the works of foreign mathematicians, whose methods, not being those of Newton, were officially ignored at the University. Yet now these young men had the temerity to suppose that Cambridge would do well to adopt them. These were in the days before Waterloo, when Cambridge Dons lived isolated in their Eastern Fens and held no personal

x Elected F.R.S 1813. (until 1910? there was always a member of the Herschel family a F.R.S) his father having been elected in 1781 ? when Col Johnstt died?

intercourse with foreign savants. A few tutors, in the van of progress, such as Woodhouse, read these foreign modes of expression and appreciated their "elegant methods" but to post to London involved expense and fatigue. The Napoleonic Wars put a complete embargo on cross-channel traffic. All excellent excuses for the comfortable majority to present a solid block in the path of reform. Ensconced for life in their well-padded Academic Chairs, originality of thought could receive no encouragement from them. The Senior Wrangler held the first position in the University and he had attained it by the stultifying method already mentioned.[x']

Wood[x''] White, Bland, Vince, Lax and Milner all mathematicians of the old school were a formidable band for undergraduates to attack but in May 1812 something happened!

Babbage, harping as usual on the irksome work involved at Cambridge in taking an Honours Degree and hankering after those forbidden foreign fruits which he had already tasted, propounded a brilliant idea. In a playful mood he suggested that they start a Society which should be the means of providing young men with the smaller work of Lacroix instead of the so-called "Bible" (with or without comments) of the existing Cambridge methods of teaching. With high joy he and his fellow-conspirators elaborated this idea till it became so plausible that they felt something must be done to perpetuate it. Slegg volunteered to broach the matter to Edward Ffrench Bromhead[β] a very sociable Trinity man who had friends in other colleges. He saw possibilities in it and promptly undertook to have a meeting in his rooms. The conception of a scheme was immediate & by May 11th 1812 the Analytical Society was brought to birth. Accordingly during the 'Long'[γ] Herschel wrote to Babbage:

"August 1812.

Dear Babbage,

Your comprehensive letter was so direct a challenge that I am resolved to show you that I am no recreant knight, nor willing to be outdone in the combats of

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x' also See Peacock's letter, p.63.)

x'' James Wood, Master of St.John's, Vice-Chancellor. vide slab on floor of ante-Chapel

β Edward Ffrench Bromhead of Thurlby Hall, Lincolnshire. F.R.S.

γ See Appendix B Chap.11.

which I dare not open, without which I can advance no further. Wherever I venture to steal a glimpse I find new and rich views opening on every side, which I should be mad were I to pursue. But in eight or ten weeks it will be all as if it had never happened, except that so much more of the very best part of my life has been wasted. This is a comfortable consideration which I will not dwell on."

His mental exaltation continued for 5 more months and then (as a reward for all this absurd treadmill-work produced by the brains of young men) Herschel's name appeared in January 1813 above them all as "Senior Wrangler", i.e. first in the Tripos list and as "First Smith's Prizeman" in the later examination. The exploit had degenerated into a contest of sheer physical endurance among the rivals, their Tutors all assured them that if they slogged away steadily, 7 or 8 hours a day at the set books for 3 years and then if they wrote it all down (for this almost meant getting the set books by heart) they would win through with flying colours, breathless but safe!

The first letter of congratulation for Herschel came down from Glasgow. Grahame wrote:

"Jan.26 1813.

Your letter has just reached me and delighted me beyond expression..... I hope you have now recovered from the state of exhaustion in which you wrote, my dear Batchelor, my bonnie A.B., my Senior Wrangler, I hope your success has made your heart glad and delighted your Parents."

Early in February Dr. Robertson wrote from Edinburgh where the news had just reached him, to congratulate Dr. Herschel on the achievements of his son.

So now, the examinations safely over, Herschel drove home to Slough for a complete escape from it all. His Aunt Caroline feels it is an Annus Mirabilis and, thanks to her vivid interest, we can step off the coach with John at Slough and hear them celebrate his return by a homely little family dinner-party. Congratulatory letters poured in from Cambridge, Yet John Herschel remained the "quiet, unassuming youth" of the poet Campbell's description. Miss Herschel's Memoir tells us that "from the time he entered the University[x'] till

[x'] Jan: 1810 as Freshman gained a College Prize. June 1811 as Junior Soph: do
June 1812 as Senior Soph: do.

analysis. Prepare yourself for an overwhelming torrent of formulae — for, by all powers of x I intend to give no quarter.

Before I begin however to exert the valour of my arm I must thank you for remembering such a poor soul in purgatory as myself. Your formulae operated as a cordial on a stomach more than half turned with Newton - and the result was a very dashing Memoir for the An: Soc: which I finished the same evening, and the cream of which I shall send you together with some theorems analogous to yours in some measure..... But I really ought to apologise for sending you such an unconscionable rigmarole. To say the truth I am more than half asleep for it is shockingly late and the cramming system has made me a mere dolt. Dire skeletons of geometrical figures haunt me in my sleeping as well as waking hours and I dream of Archimedes riding on a long, lean, bony parabola.....I would advise you that you have some regard for the shortness of human life in your problems for the future. These are really dreadful calculations. The hyperbola is one of the most complicated I have met with for a long time. Non omnia possumus omnes.....Farewell.

Aug. (The Lord knows what day of the week and month) 1812."

In December 1812 he wrote with a certain respectful impatience to Dr. Herschel about the impending Tripos.

Only cramp in his fingers and a shortage of paper limited his flow of thought. He winds up by saying: "I have been scribbling from 8 till 2, during which time I may safely say I did not think once." The letter is as follows:

"Dec.1, 1812. ....; The time of my leaving this place, (involved in uncertainty as the event of the approaching examinations must be) it is quite impossible yet to assign. I can however fix a limit less than the period of my stay. The examin[n] commences on Plough Monday (Jan.13 I believe) and I think continues ten days or a fortnight - after which if the event be such as I have reason to suspect I shall be at liberty immediately - otherwise I shall feel entitled to enter the lists again on a yet more extensive field. The impatience with which I look forward to the termination of this childish course of study is inconceivable. I see lying in my room books which I long to read and

Hardly a month after the posting up of his Tripos results he gave Babbage a resumé of his intentions and thoughts:

Slough. To Babbage. Feb.8th 1813.

".....After leaving Cambridge, I fell into a sort of indifference with regard to Analysis which lasted me till yesterday, when I drew up a sketch of my memoir about the series of tangents, and to-day I filled up the skeleton with as much flesh as I could scrape together and sorry I am to say that after all it will be but a sort of meagre anatomy, fit only for a scare-crow.

You know how fond I am of strange oddities and inconceivable theorems. I worked out a most elegant one this morning.....

I have got some more theorems, but we must defer them till another opportunity, as I must now dress for a party.....

I have an host of questions to ask about the A.S.* You cannot easily imagine how anxious I am on this subject. I trumpet its fame as much as I can, when I meet with anyone who can at all enter into the subject. It is true, my opportunities are not very frequent, but what there are are precious. For heaven's sake keep up a solemn serious appearance about it at Cambridge, and be for some time very cautious whom you admit..... We really now must begin to be somewhat in earnest, and avoid 'everything common or unclean'. What say you to determining an annual subscription, that each member may know what he has to pay. For instance three guineas (or more, or less) per Ann: or else a donation of £50 at first entrance in lieu of it. Do you not think one meeting in a term enough? I think no member should be elected without a written notice from himself that he wishes it, and a written certificate from one member that he is a fit person. Perhaps it would be as well(as soon as it can be done) to contrive to have another secretary resident in London, - at all events to transfer the "seat of empire" thither as soon as possible. For I repeat it again and again, we must not be a "Cambridge" Analytical Society".

Later he wrote:

"Slough.

I am reading uncommonly hard. At length I have set to work in good earnest on the Mecanique Celeste, with which I am more charmed every day, tho' of course my progress is very slow, as I wish to be as systematic

* Analytical Society.

his leaving, he had gained all the first prises (sic) without exception," and she described the further jollifications for his 21st birthday when Upton Church bells were rung in his honour. "Miss S. White[x'] with her maid Sally (one of my Nephew's Nurses) came to be present at my Nephew's 21st birthday. I joined the company that dined there on this occasion. This puts me in mind of a very handsome Necklace with which my Nephew presented me on his Birthday. ... My Nephew went again to Cambridge to offer himself as a Candidate for a Fellowship[ø']... Mrs. Herschel and Miss Baldwin followed my Nephew to Cambridge to assist him in settling his occasionally (sic) residence there."

Herschel's boyish spirits soon revived. He cast off his self-imposed discipline. The vigilance holding back countless speculations within his mind relaxed and they burst forth like floodwaters over a mill-race to fall on to the head of Babbage, (for Herschel felt no misgiving about their reception). He wrote to him a whimsical letter: "Let me congratulate myself on my singular good fortune in possessing a correspondent to whom, on two such out-of-the-way subjects as Mathematics and Chemistry (besides every other out-of-the-way subject under the Sun)I may communicate my most out-of-the-way ideas, in the most out-of-the-way manner, without fear of being thought out-of-the-way. In serious language, however, it is a great privilege to have a friend who can participate one's ardour in such subjects and you see I am determined not to let it remain a dead letter."

Neither did it remain a dead letter, Babbage soon again heard from him, Mathematics surged through his mind during the next five years. He designed much work (which never saw light)besides concentrating on their new Analytical Society for which within that period, he wrote all his contributions and planned its rules in detail as though the Society should last for ever.[ø4]

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x' Note by J.F.W.H. Came of age Mar.7th. Bell-ringers £1.1.0.

x² Godmother to J.F.W.H. Lived at Shaw near Newbury.

ø' Admitted Lay Fellow 6 Ap. 1813. Resigned on his marriage 1829

ø4 Most unguardedly he lent the only copy of their regulations to Babbage then intent on recording a "History of the Analytical Society". It never re-appeared.

recruit her strength, [illegible] John's thoughts were racing off far from these seaside resorts. Then he wrote to Babbage from Cambridge:

"It is my failing to do everything in too great a hurry and take time and trouble afterwards to retrieve my blunder. I wrote to Smith (the printer) but sent my letter to London by so uncertain a conveyance (in hopes of gaining a day in the post to save time) that it is 10 to 1 he never got it ..... I beg that you will get the Preface into as great a state of forwardness as possible .....Smith can put the Preface in hand immediately but Peacock whom I met at Hastings, agrees with me that we had better wait till we can meet and read it over ..... I showed your Memoir to Ivory, Wallace & Leybourne at the Military Coll: ..... Is it really out of your power to come a few days earlier to Cambridge?.....the principal reason for an early meeting is to consider of the means of raising money, a very necessary article in these hard times. Another is to lay a plan for our future conduct and perhaps to draw up a Report of our past.....I am glad to find you agog for Chemistry. I am just now equally eager to prosecute that pursuit - and if Ryan continues in the same way of thinking, by the Lord, I think we may turn Peterhouse into a furnace, Trinity into a Laboratory, and St.John's into — into what? - it is fit for nothing but to throw the broken bottles, and the caput mortuum into. I should like as a first experiment, to make a party for breathing the nitrous oxide - you know we talked of that once before, but like several of our wise plans, it came to nothing.

As for me, I have neither blowpipes nor mirrors, nor oxygen, nor hydrogen, nor any of the things you enumerate. I am very little conversant in the actual manipulations of chemical experiments - chiefly for want of conveniences, and opportunity.[x'] A man cannot do everything, and all at once. God knows how ardently I wish I had ten lives, or that capacity, that enviable capacity, of husbanding every atom of time, which some

x' There is a tradition that Herschel's rooms at St.John's at this time were distinguished by the number and size of the bottles arrayed outside his door for lack of a College laboratory where he might work.

as possible in my reading.....I presume you are employed about the preface. Do you not think that a few words should be added with relation to the particular source from whence this singular publication emanates? Is it candid, nay, is it politic, to keep the public quite in the dark as to this point? Place yourself in the situation of one of our readers (who possibly may be more numerous than you think) would you not naturally say 'Who are these people?' 'Are we to have a series of volumes like the present?' (putting the best side upwards) 'Is it possible to get among them?' 'What are their resources, their views, their expectations?' If we pass over all notice of this, consider how open we are to ridicule in the character of a few unknown quixotic individuals who take upon themselves to enlighten the world with:

'books which shun the sight of men,
Books which remote from every eye,
In their own darkness sleeping lie!'

Justification exists for Herschel's warning. Anonymity mystified the reading public, Moreover it seriously misinformed them, for Leybourn wrote to Herschel:[x'] "A report has gone abroad that Woodhouse is at the head of the Analytical Society."

The Analytical Society met in Cambridge during May 1813 when Whittaker, deputising for Herschel as Honorary Secretary, reported to him afterwards: "We had a Meeting of the A.S. on Wednesday. I read the Preface, besides voting a Subscription of £3. It was the most regular meeting we have had."

Three months later Herschel first mentioned Peacock[x²] as a writer he should wish to attract.

By the end of the first summer[x³] Herschel's patience wore thin; the Cambridge printers worked too slowly; he wants "to stand over them with a Cat o' Nine Tails"; even the Royal Society gets no reverence from him: "another number of the Phil. Trans.[x⁴] is come out. It contains my paper on Conic Sections[x⁵] (don't laugh), perfectly murdered and translated into an unintelligible nonsense by their confounded printers."

Slough became an impossible place for concentration. The household at Slough had been unsettled for weeks by his mother's prolonged illness. [illegible] he and his father spent the summer in driving her about the South Coast to

x' March 2, 1813.
x⁵ Op. 9.
x⁴ Philosophical Transactions of the Royal Society.
x³ June 1813 had become Junior Fellow. Took his M.A in 1814.
x² George Peacock afterwards Dean of Ely 1791 to 1858.

possess, and which enables them to do ten times as much in one life.

I have an experimentum crucis on the composition of water, which I wish we could find some means of making - but a galvanic pile of some power would be requisite for it."

John Herschel diagnosed his own character unerringly when he said he wasted his time retrieving his own impatient blunders. The time had come for serious thought.

The brilliant result of his Tripos work lay behind him, a step into the unknown lay before him. He was capable of blazing tracks in all directions through the unexplored forest of philosophy. Mathematics, Chemistry, Astronomy, Physics and the rest but, for that generation, the graduates' well-trodden path passed through the gateway of ordination, custom would likewise demand it of him. Young men of marked ability found the way mapped out. They merely went through that ceremony and were immediately in the running for settled positions - probably sinecures - connected with these sciences in the University. They promptly snuggled down "dans sa molle épaisseur" to a routine College existence entirely oppressive to Herschel's gallant spirit. His innate honesty too baulked at such a degrading misuse of Holy Orders. And yet his friends conformed without a qualm and his father, a man of genuine piety, urged it upon him.

John Herschel in fact anticipated his generation by many years. His character towers above its sordid standards.

At the present day we laud the position adopted by this thoughtful youth. To stomach the unabashed worldliness of Bishops and clergy and contemplate the possibility of receiving a portion of the loaves and fishes through conforming to such a scandal was to him intolerable.

During the summer driving-tour of 1813 he may have mooted the question in an inconclusive way to his father or mother; at any rate the choice of a career harassed his thoughts throughout his Tripos year and then he dashed into the wild idea of becoming a barrister (only to retrace his steps later and to start again).

When he returned to Cambridge that autumn he decided on the Law and wrote to his father perhaps with more self-complaisance than he intended. His father's answer implies this and in a footnote to the letter written years later (circa 1864) John repents in sackcloth and ashes.

Here is his father's sagacious and affectionate letter:

"William Herschel to J.F.W.H.

10 Nov. 1813.

My dear Son,

You request my opinion on a subject which is of so much consequence and upon which so much may be said, that it will hardly be possible to enter into it properly by letter writing, but what is more you have already given your opinion of it and to ask mine seems to be a mere matter of form. You say,'I cannot help regarding the source of church emolument with an evil eye'. The miserable tendency of such a sentiment, the injustice and arrogance it expresses are beyond my conception.

You mention the necessity of a mode of acquiring a livelihood, and that a man should have some ostensible means of getting his bread by the labour of his head or his hand, as if you already found yourself in confined circumstances or had no expectation of assistance from your parents which you well know is not a just idea of your situation.

You say that Cambridge affords you the Society of persons of your own age and of your own way of thinking; but know, my dear Son, that the company and conversation of old, experienced men of sound judgement, whose way of thinking will often be different from your own, would be much more instructive and ought to be carefully frequented.

But now let us compare the end proposed and the means of obtaining it in the two liberal professions, of which it seems, the choice is to be made. Your own words with regard to the church are: 'The path was wide and beaten and I had only to pursue it'. Can anything be a higher commendation of it? Such a path must surely lead to happiness, or else it would never be so wide and so beaten. You admit that you had only to pursue it. Very true, for you are in it and have all this time been in it. May you are already far advanced in it having not only carried off the highest honours of the University but being already in possession of a fellowship; which insures your success in the pursuit of the path.

How is it about the path of the Law? It is crooked, tortuous and precarious. It is also beaten— but how many have failed to acquire an HONEST livelihood?

Clergyman on the contrary, without the least derangement of his ostensible means of a livelihood, has time for the attainment of the more elegant branches of literature, for poetry, for music, for drawing, for natural history, for short pleasant excursions of travelling, for being acquainted with the spirit of the laws of his country, for history, for political economy, for mathematics, for astronomy, for metaphysics and for being an author upon any one subject in which his most advantageous and respectable situation has qualified him to excel. He may also be a happy family man, a husband, a father and with a paternal fortune added to his other means he will have all the real enjoyments of life within his reach.

With my best wishes for your happiness in which all the family joins

I remain my dear Son,
Your affectionate father
W.H.

P.S. I have never conversed with you in religious opinions, because I wished to leave you at liberty to follow your own sentiments but when next we meet and communicate our thoughts to each other I believe you will find that two unprejudiced persons with natural good sense between them cannot disagree on this subject".

(Note by J.F.W.H. written many years later.

"In reply to a very wrongheaded and most foolish letter to say the least of it and one which I most utterly repent having written. I keep this as a perpetual memento of my self-condemnation. And may its perusal teach me humility and self-distrust henceforward. The words are those of wisdom and goodness. The whole perusal gave my whole being a sort of wrench and opened my eyes to my own folly and perverseness. May I be forgiven.")

His mother hurried in a few lines at the end: "...my wishes were for the Church..."

A further letter from Dr.Herschel to his son.

"Nov.14 1815.

Your letter has had nearly the same effect upon my disposition as mine seems to have had on yours. You are not in that path and it is almost too late to enter it; your studies have been of a superior kind.

You say the church requires the necessity of keeping up a perpetual system of self-deception or something worse for the purpose of supporting the theological tenets of any particular set of men. The most conscientous clergyman may preach a sermon full of sound morality and no one will require of him to enter into theological subtilities. A philosopher could not scruple to recommend the forbearing disposition of Epictetus and would as little hesitate to inculcate the Doctrine of Christ to love your neighbour as yourself and to act towards him as you would wish he should act towards you.

Now cast a look upon the Law and Lawyers. Is it not evident that at least one half of them do act against their better knowledge and conscience? Whenever a lawsuit is decided the lawyers on one side are always proved to be in the wrong, which must arise from ignorance, self-deception or from a worse principle. It may be alleged, with regard to a person in the Law that his situation is such that, in order to get his bread, he must undertake the defence of a bad action for a conscientous man may starve where one of a different disposition will flourish, as by his eloquence he may save a traitor from the gallows. But who would envy his fame if he succeeds in a cause which all condemn? On the other hand a Clergyman may get his bread and always act conscientiously and do good to every person with whom he has any connection.

The most material circumstance is still be to considered. You say that, independent of the mere drudgery of the routine of the law, it allows an unbounded scope for the exercise of the labour of the head. This I maintain to be a most egregious error. The drudgery of the Law as you yourself call it, requires the Lawyer's whole time, or else he can get no bread. To the clerical life on the contrary you object that its natural bias lies towards habits of indolence and inactivity; which evidently admits that a clergyman is in possession of dignified leisure, and that he may even waste his time if he likes it. Is this an argument for one who wishes for labours of the head? and would even take some of the pressing moments of the Law by which he is to get his bread to bestow them on such labours? A

When the Tripos was imminent, he had wrote to Herschel in the most cheerful devil-may-care fashion, dating his letter:

1813. "The evening before execution - January - (I don't know what) - but let us eat and drink for tomorrow we may be plucked. Query? the odds? I have been endeavouring to put a stop to my idleness and to the continual evolution of mad schemes forming in my brain. I have been chemicalising a good deal and have met with much success in cutting, burning and defacing my own hands."

He scraped through on a Pass, and Herschel addressed a jeering congratulations to:

"The Rev. C. Babbage,
Batchelor of Arts of St. Peter's College
in the University of Cambridge.....
....."So I am told you are Captain of the Gulph[x1] with all your blushing honours thick upon you..... Who got the Spoon?"[x2]

These scenes are no exaggeration. J.W. Whittaker,[x3] also in for this Tripos, described the whole affair in two letters to Herschel besides telling us of the unbelievable conditions for Honoursmen writing in the gallery above the Pass-men's 'viva'.

"Babbage had a very crowded audience. He kept ye Freshmen in a roar of laughter, you can guess what at. Jephson asked him if he recollected some formula and Babbage coolly answered: 'Nonne colligi illud expressio. (Abominable Quantities - Cosimus and methodus')..... I want to have your opinion of Jephson's behaviour to Babbage. Having publicly reproved him in the Schools, he refuses to hear anything said in his favour, or in extenuation of his offense. I very strongly suspect that Babbage deserved the treatment he received."

"28 Jan. 1814. Whittaker to Herschel.

Our manifold troubles are over at last. I crammed up several things out of your Manuscript of the "Tides"[x4].... Macfarlane's evening paper was very difficult and he was thought somewhat ursine in his behaviour and in the exiguous supply of cake and wine which precluded the possibility of my following your

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x4. This is the earliest indication of Herschel's interest in Meteorology.

x1 First place in Ordinary Degree (nick named "Poll-men")

x2 Last name in Junior Ops (nick named "Wooden-spoon").

x3 J. W. Whittaker. Appointed Domestic Chaplain to Archbishop of Canterbury at Lambeth Palace, Mar: 1821.

If you are afraid of having said anything for which you would condemn yourself, I am equally afraid that I may have said what might appear to breathe a spirit of bitterness. I hope however that we both know such ideas are equally without foundation. I can as little doubt of your sincere attachment to your old philosophical father as he does of your returning filial affection.

It would be a vain attempt to enter into arguments about the subject under consideration, which can only be discussed in a few conversations, and must therefore be postponed until we meet: for to say the truth I can gather nothing from the contents of your letter but what amounts to: 'I do not like the Church, I prefer the Law', and for this very reason I cannot but wish to hear everything you have to say upon the subject..."

Mrs. Herschel added a few lines of motherly solicitude:

"......I have great pleasure in sending you this letter and hope it will remove any apprehension that might remain in your mind that you had said more in your letter to your father than you thought right or that your father might have done the same in his. You both meant the same thing which was to make both happy. I cannot see that it will be possible to settle any plan without your meeting, cannot you dine with us on Christmas Day, you would make us all happy?"

The unity of the family life at Slough remained unbroken by this difficult decision, and John finished the Autumn Term at Cambridge working with furiously ardour at Analytics, he prepared four papers for the printer before going home for Christmas. and At the same time he rushed headlong into Chemistry, his enthusiasm having flamed up afresh on receipt of Babbage's excited scrawls from Teignmouth telling how he intended to come up to Cambridge "to pursue Chemistry" and "shall procure a large blowpipe with double bellows!" In actual fact Babbage put his name down at Peterhouse in 1813 and made a whirlwind rush through the Schools, his indecorous conduct during his Acts and Final examination considerably brightening up the onlookers at the Senate-House. He wrote to Herschel in impish glee about his buffoonery: "In the moral argument I quoted St. Luke in English and in Greek and spoke half Latin half English, this together with the singularity of the argument made Macfarlan (sic) and everyone in the Schools laugh most heartily".

second article of advice! In the course of the Examination two things were asked out of the Analytical Memoirs! Babbage (who is in the Gulph, but would have without doubt have been plucked if he had not been classed), worked one of them and report says it was the only thing he did. We had a most severe frost during the examination.[x'] Surely nothing is more abominable than those morning problems, kneeling down in the gallery and writing with frozen fingers and hearing the distant hum of pounds-shillings-and-pence problems below. I never hated an occupation so much in my life."

Agreeably to his mother's invitation John ate his Christmas dinner at home and firmly rivetted his decision to read Law but he did not leave Cambridge matters at Cambridge, for the financial affairs of the Analytical Society also worried him. The printer's bill had come and he regarded himself and Babbage as practically the only authors of articles, therefore hesitated to ask other members to share this bill. A business education might have inclined him to Babbage's view "that it was equally unexpected by all and should therefore be equally born (sic)."

The Minutes of the Analytical Society having gone astray the result of the argument remains obscure. In itself it reflects the native delicacy of Herschel's reasoning:

"Jan.12, 1814. Herschel to Babbage.
Slough

.....I was so much enraged at your quitting Cambridge without in any way apprizing me of your departure that I had determined not to write to you - how I keep my resolution you see.

Smith has sent me his bill.....the Analytical Soc: will owe Smith about £78, a good round sum, and it is our next concern to see how this can be raised .....There are 3 ways which strike me

1. - Either to raise the Cash amongst us equally,[x²] or about £10 a piece, (which I cannot help thinking a very unfair and unjustifiable way of going to work); or (secondly) to allow me as secretary, or treasurer, or burser, or what you will, when the proper time for paying Smith comes, to advance the whole Sum, and so to transfer the debt to me, which at all events would be better than owing

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x' The celebrated frost of 1814. when the Thame at London [illegible]

x² ? Peacock, Babbage, Herschel, Ivory, Bromhead, Wallace, Gwatkin, d'Arblay, Leybourn, Mill. See Babbage's M.S.S.

money to our printer as I would be lenient, and give the Soc. as much time as they pleased — or thirdly, for you and I the writers of the Memoirs, to pay for them, in proportion of the number of pages occupied by our respective 'labours', dividing the preface equally between us. This would make your share £26 and mine £52.....

I must say, I think this last the only honourable way in which the business can be settled. I do not, I confess, at all repent the publication, but I believe everyone else must look upon it as a very mad scheme, and as we two were undoubtedly the ringleaders, if not the only two actors in this literary assault upon the peace and quietness of the world, it is but right that we should pay the damages awarded.....

I must say that I should feel very queer under the reflection of having inveigled a parcel of unsuspecting undergraduates into the publication of any of my writings at their expense, - and I think you will agree with me, that an exaggerated account of your conduct, might amount to at least a suspicion of this."

Hitherto his father made all John's decisions for him. Now an obstinate wish to carve out his own future kept him on his rash course. He meant to put his name down at Lincoln's Inn and read for the Bar though Nature never intended him for such work. He doubled the strain, for he confesses to Babbage that he is doing it against the wish of his parents. However, he held on his way. After Christmas at home, his mother, though wondering at this decision, devoted herself to settling him in London for his Law training. On Jan.17th she, with her niece and John drove up to Town, engaged rooms in Henrietta Street, Strand, and from his aunt's house in Kensington watched over him for several weeks before she drove home again.

His name is officially entered on the Admission Register of Lincoln's Inn: "Jan.21, 1814. - J.F.W.Herschel Esq. of St.John's Coll: Cambridge, only son of W. Herschel L.L.D. of Slough, Bucks."

In London John found himself conveniently lodged. Lincoln's Inn at his elbow and Somerset House (at that date still the home of the Royal Society,) only a short way down the Strand, most accessible for its Meetings and for meeting in person all contemporary men of note and hearing all the latest talk on Chemistry and Mathematics. He had only been a Fellow (F.R.S) for about a year and already

In spite of)
this sudden exhibition of a private
disagreement
family accord at Stonefield remained
undisturbed. the hitherto docile Jo Mrs finished
papers, which are they? A B C etc
Dreyfus?

after spending the Xmas Vacation at home, his
obstinate decision to cause
up to date

two papers by him on Mathematics had appeared in Phil: Trans: while the R.S. published a third on "Finite Differences". During 1814 the brilliance of his mathematical abilities drew a pleasant compliment from Laplace the doyen of French mathematicians; he wrote to the elder Herschel: "I have only had time to glance at the paper by your son but it is sufficient to show me that he is destined to be in Mathematics what his father is in astronomy." And yet, in the result, Mathematics only proved to be one in his quiver full of arrows.

John Herschel had virtuously informed Babbage that he was come to town solely for the purpose of reading Law, but, could he hold himself down to reading about the past in old law-cases whilst the present and immediate future of science bubbled over with the excitement of discoveries and with the prospect of unlimited progress in chemistry and the sister sciences? Such, and such-like was all being thrashed out around him, which He dashed off to write (to) Babbage the latest chemical news:

To Babbage. "18 Henrietta Street.
Jan. 26, 1814.

.....I was last Thursday at a Meeting of the Royal Soc: where a paper of Davy's was read of a highly curious nature. It seems that a new substance (elode or iode) has been discovered by a Saltpetre manufacturer, in the Mother water of Saltpetre. It may be obtained by pouring Sulphuric acid on kelp. Iode is a black shining substance like plumbago. - A moderate heat volatilizes it in a fine claret-coloured vapour..... I have a good deal of Chemical News for you..... The second part of the Phil: Trans: contains two papers by Berselius & Marcet on the Sulphuret of Carbon (Alcohol of Sulphur) which we were making.....Berzelius says that in the way that we proceeded, he has made as much as half a pint in a day.....I have been again to the R.S. Wollaston had some iode in a glass tube. You may make it by pouring sulphuric acid on the ashes of Kelp from which the soda has been extracted. Violet fumes arise, which condensed are iode. Its S.G. is 4."

With this fuel for his flames, his enthusiasm over Mathematics and Chemistry rose higher and higher, and reading in Chambers became more and more a nightmare on

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x' Op.3 and Op. 10

on his conscience; however, he gossips cheerfully enough to his father about the day's work in Lincoln's Inn, writing:

May 1815.

"I am become a regular attendant at Mr. Sander's office busily engaged with 6 or 8 more in the same situation in sinking from the theory to the practice - from the spirit to the forms of law - transscribing voluminous conveyances etc. etc. Information is picked up there in a curious way. As fast as cases come in to Sanders for his opinion, when he has made up his mind, they are sent to us, in the office, here they run from hand to hand and are talked over; those who have been more accustomed to business explaining difficulties to the rest. I usually spend 5 or 6 hours there daily. It is not wonderfully amusing but still not nearly so dry as I had had it represented.

P.S. I have just been transmitting a communication to the Geological Society through the hands of Professor Clarke on the composition of mineral into which silex enters as a principal ingredient. This does not look very lawyer-like, but I still believe that even that profession is not all-engrossing. (I mean no sort of pun)."

Leybourn had induced young Herschel to write again for him in the "Mathematical Repository" and for his own pleasure he worked at Chemistry sufficiently to warrant submitting a paper to the Geological Society, but so far from possessing worldly ambitions he failed entirely to realise his dormant possibilities, which might have found a splendid spring-board for higher offices had he given a different reply to Professor Hornbuckle's letter* from Cambridge forwarded by Dr.Herschel.

x' Op.9 and Op'10.

* St.John's. May 2,1815. Professor Hornbuckle to J.F.W.H.

My dear Sir,

Circumstances will, I find, enable me to offer a tribute of attention where it is most justly and truly due in proposing to you the offer of Assistant Tutor at Michaelmas next.

You are so thoroughly conversant with the whole of the Subjects we give lectures in that I need say nothing more than that I shall be happy as far as I can, to render your share of them pleasing to yourself. I cannot say that the stipend £100 per ann: is adequate to the trouble, but if I am not much deceived you will think it made up by the usefulness and credit attached to the situation.

(Note continued on next page).

John opened it and found it to be a most complimentary offer of the Sub Tutorship of St.John's. In a moment, by return of post and without consulting anyone, John refused the appointment in most lofty language, and then mentioned it casually to his father, when next he wrote, saying that he had done so "as my profession would not allow my discharging the duties of the situation." The question of taking Holy Orders seems not to have arisen as an objection. In the course of his reply to Prof. Hornbuckle he said: "my views in life are, at length, too fixed and my steps too decidedly taken to admit of further change;"

However "qui vivra, verra" for, at the same time, behind a bantering manner he poured out his real feelings about the Law to James Grahame at Edinburgh. They were bitter enough, he felt disillusioned and listless, whilst Grahame diagnosed in masterly style (q.v.) the phase through which Herschel's thoughts passed during 1814 and 1815.

Late in the summer he coached away from the hot, languid streets of London into the cooler air of Slough and soon rambled off in a desultory letter to Babbage on science, ghosts and politics, though on nothing closely personal, for Herschel remained mute on such subjects.

Into this roaming correspondence Babbage, with his peculiar skill, hurled a bombshell. He announced abruptly to Herschel that he had married a lady and that he and his father had had angry words!

Herschel's reply verges on the pompous, for in these matters he lagged far behind Babbage in maturity of thought; he had doubtless considered them in the abstract but he was not yet ready for the plunge.

(Note continued from preceding page.)

"It will give sincere pleasure both to myself and Mr. Bland, should your views in life permit us to avail ourselves of your services as a Colleague. You will turn this matter in your mind and favour me as soon as convenient with, I hope, your assent to the proposal."

Mr. Hornbuckle's letter concludes with an allusion to the typhoid epidemic raging through the University. "The V.C. and Heads have agreed to bring in a Grace for the purpose of giving the Undergraduates the present Term. The medical men I believe are not agreed in thinking it necessary, but perhaps it will be a proper sacrifice to the general alarm."

1814. Aug. 7th. Shaw Newbury.

"Dear Babbage,

Almost immediately after I had dispatched my last I received yours. The degree of intimacy which has hitherto subsisted between us calls for somewhat farther than the common forms of cold congratulation. I did not expect that our courses would so soon divide. - But sooner or later the time must come to all of us when the Duties of Men shall take the place of desultory pursuits and boyish amusements - and the sooner the decided step is taken - the sooner the plunge is made - the sooner do we get rid of the weariness of idle expectation and the anxious load of choice. Your step has been decided - your plunge deep indeed.

"I am married, and have quarrelled with my Father".- Good God, Babbage, - how is it possible for a man calmly to sit down and write those two sentences - (add a few more which look like self-justification)- and pass off to functional equations! But stop - I am not going to write you a sermon. Three months hence will be time enough for that. I am happy to see that you seriously intend to set about being useful in this world. To one who like ourselves has existed more in theory than in practice,[x] who has made the beautiful and the abstract his cynosure in mockery of base utility - the resolution must ever be difficult to form, and more so to follow. I can only wish you may have energy and determination enough to go through with it. For my part I feel that I never shall.....

On running over the above, I perceive that I have been sermonising - and that I have not yet thrown off my metaphorical chrysalis. When that takes place I know not in what variety of colours I shall glitter. Till then, however,

Believe me ever
Yours most sincerely.

P.S. You have not informed me who the lady is. I presume it can be no secret."

To the same. Sept 26, 1814 London.

"....Enough of Chemistry.....I received your last letter - and altho' I do not altogether wish myself in your situation, yet I was much gratified with the open confidence with which you communicated it to me. Action is the word now for both of us, an honourable and manly exertion.... I am come up solely for the purpose of reading Law and am really studying it with avidity. I am determined, as the profession is of my own chusing much against the wishes of my Parents, that I will pursue it in good earnest."

Bold words and an assumption of manly self-reliance may have satisfied Babbage, but Grahame was not to be deceived. He detected the strain on Herschel's emotions, and none too robust health, in running counter to his parent's wishes and sticking to a subject he should never have touched, whilst beneath these, his thoughts persistently hankered after Natural Philosophy. The truth was that he, John, had had no training for taking his own line. Even on the summer tours Dr. Herschel could not sit idle and let the boy learn.[x] John rightly told Babbage that hitherto he had "existed more in theory than in practice."

Subsequently Babbage, as a married man, enquired about the possibilities of a house at Slough, but got no encouragement from Herschel who disliked the neighbourhood intensely:

To Babbage:

".....I cannot give you a very tempting account of our neighbourhood as a residence. There are seldom any decent houses to be had in Slough.....But the worst part of the story is the Society, which owing to the vicinity of the court is in general particularly unpleasant. For my own part, were it not for family connexions, I should never more approach the place. Indeed but a small part of my time has of late been spent there, and in future I shall be obliged to curtail even that a good deal."

Then followed a quiet summer chiefly alone with his delighted mother, but he told Babbage that he had been to the Greenwich Visitation with his father and made the acquaintance of Marcet[+] at the dinner. He found him "uncommonly pleasant."

From Slough in 1814 to get to Greenwich Observatory and back meant a night in London, going from Slough to the 'Bolt in Tun' in the City per coach, then, (unless offered conveyance in the Admiralty Barge) in a waterman's rowing-boat, starting below London Bridge to avoid shooting the arches with their rapids and whirl pools. Careful consideration had to be given as to the

x' See p. 18 above Chap.
+ sup. 129 above

state of the tide for the pull back, and then there was the journey to Slough to fit in with the hours of the Windsor Coach, probably one of the night coaches. It was a weighty undertaking.

After these peaceful events his Terms at Lincoln's Inn permitted him to go up to Cambridge again and he found himself appointed one of the Examiners at St.John's.

St.John's College, Cambridge.
Nov. 1814.

To Babbage.

".....I was interrupted yesterday by a host of our common Friends who called, and at present I am plunged in all the horrors of Examination. You know not what it is to be an examiner.[x'] Thank your stars you do not. 'Heaven in its mercy spares thee this last woe!' Here have I, who know as much of Newton, as the child unborn, had to make 20 problems. I put it all off till the last moment, and then did them all wrong in one morning, so that one half of them are cram and the other wrong. I do not however, much care for the latter defect, as a man who sits down decently prepared (in Cambridge style) will be sure to bring out the required result, true or not, and the best of it is, that he will believe it when it is done.

I do verily intend to take to Mathematics once more, and I think of giving up Chemistry altogether, but it is not without sundry wry faces and intellectual qualms and contortions that I think of this latter point."

He relaxed himself at Cambridge in various ways, by joining the Union Debating Society[x²] also in attending the Literary Society, and he indulged his love of music. He learned to play the flute and had one if not

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x' A question in his Astronomy Paper 1814 indicates that the Observatory on St.John's College still functioned: "The altitude of known stars was observed on 26th May from the Observatory in St. John's College. Investigate a logarithm equation for determining the hour of the day."

x² The Union first met early in 1815 in a low ill-ventilated room in Petty Cury at the back of the Red Lion. Peacock reports the tumultuous fury of the Members when the Vice-Chancellor suppressed them and how they evaded him by becoming for a short time a "Reading Society".

two, pianos in his rooms. Being always interested in machines, his curiosity was aroused by the appearance of a machine for locomotion.
He jotted down in his Note-Book: "Paid a man 10/6 for 12 lessons on the velocipede". To ride this precursor of the bicycle, a man runs astride of a tandem pair of wheels not sitting down on the saddle till sufficient speed is reached and then, dropping into the saddle, he picks up his feet. He rides onwards, his feet on rests, in calm elegance for a short space and then recommences 'da capo'.

Five years later he put these lessons into practice by riding a machine called a "Drasine" at Bath. This model has not been traced.

For the Hilary Term at Lincoln's Inn he lodged himself in Norfolk Street, Strand, but the news of Smithson Tennant's[x'] sudden death on the 15th of February 1815 drove all virtuous resolves about the Law to the winds,[x²] the Chair of Chemistry at Cambridge would have to be filled and he tells Babbage how he tried for it.

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x' Smith Tennant F.R.S. 1761-1815.
Killed at Boulogne from a riding accident when with Baron de Bunsen. A drawbridge collapsed under him and he died on the spot.
Prof. Chemistry 1813-1815.

x² In Lord Chancellor Campbell's Autobiography he says at an early date: "There are two ways for a man to get on here, to force himself into notice as much as possible at once, or, to lay in obscurity the foundation of future omniscience.....I do not think that the law has at present any right to rank as a liberal profession, I am sure I should receive as much general improvement in making shoes as from copying precedents."
x i.e. reading "Law" in a barrister's chambers.

To Babbage. 23 March 1815.

"I am much obliged to you for your enquiries. When I heard of Tennant's death some demon put it into my head (no doubt he inserted the idea through a crack in my skull) to try for his vacant chair.x1 I accordingly took the usual steps on such occasions, but soon finding the ground pre-occupied, I made my retreat with as good a grace as might well be and have nothing for my pains, but the satisfaction of knowing that if Tennant had lived a twelvemonth or two years longer I should in all probability (if any faith is to be put in vehement asserverations) have been his successor. I do not care much about it, and on the whole I believe it is better as it is. I have been attending Clarke's lectures and am become half a mineralogist - and have been analysing some of his specimens for him".

But this rush of life could not go on much longer and a serious break-down in his health occurred. In his Aunt's Memoir she states:

"...after the first year close study it was found necessary to go to the sea-side for the recovery of his health and by Dr. Baillie's[x] and his Father's advice he gave up the idea of becoming Lord Chancelor (sic) and returned to Slough with a Load of Law Volumes."

William Herschel's view of the matter

x1 W.H. to J.F.W.H. Mar.1, 1815. "It appears to me at all events a desirable object to obtain the Chair which is vacant by the death of Mr. Tenant (sic) and if you think the exertion of the interest of St.John's will be successful it will certainly be worth trying for it. I know you have an attachment to Chemistry and am of opinion that you will soon attain some eminence in pursuing the open road to fame in that science."

x2 Dr. Baillie, 17 - Court Physician to George III and brother of Miss Joanna Baillie, the poetess.

To the sea-side he was accompanied most faithfully by his mother and his Cousin Sophie, where in spite of immense boredom, Brighton did him good. It cured him of any further attempts to "eat his dinners" at Lincoln's Inn though he did not take his name off the books until November 1816.

To Babbage. "Sept.1815.
Slough.

"....Dr. Baillie[x] has been so kind as to order me off to Brighton where I am going immediately. I have been in medical hands ever since I left town, and have now the satisfaction of knowing that without great care I shall go to the dogs. When at Brighton I know I shall hang myself for want of better occupation - so if you have got any numbers you want calculated to a hundred decimals, give them to me to save me from a more dismal fate. When I return I shall set off to Cambridge without loss of time, and execute a multitude of plans in the Chemical way, unless in the meantime this carcase of mine plays me some vile trick or other. I have a glorious prospect before me.

Later.

"....Brighton has done me good, but I shall not be able for a long time, if ever, to resume my professional studies in London.

Dr. Baillie has been dismally explicit with me - and he is one of those very few medical men on whom I place reliance. I think I shall pupilize at Cambridge during term, and run wild about the country in the vacations. I could chemicise to some purpose with an additional £200 per annum, which I should get with 5 pupils, and I think I could manage as many as that well enough. Be sure (if I do) that I will endeavour to instil into them the principles of the true functional faith and practice. But I am not quite determined on this point.

I beg you will make my best respects to Mrs. B."

By October he had recovered his alertness sufficiently to cut up with great severity Babbage's theories on functional equations. Winding-up with personal remarks he wrote:

Brighton. To C. Babbage.

"....I think I have shown the nullity of (your) mode of proceeding and I have been rather long-winded upon it

x Father of Joanna Baillie, the poetess.
?

because I have remarked in your functional theories a strong tendency to cut the cable of definition, and dart off under a press of sail into the offing of an unknown and most obscure subject. Believe me, functional equations are not easy: they are not to be resolved by wholesale in this way. Many an error will rise up in judgement against you when received as an undoubted truth, and consecrated by negligence - and many a fine theory will elude your grasp, before you have overcome even the least of the real obstacles to your progress. It is always so with the inventor and ought to be no discouragement. My huge developments are for the most part (I find) abridged expressions of intuitive (or at least self-evident) truths. Some few of them however remain pretty things but no miracles.....My residence here (Brighton) has done me so much good that I shall not leave it till the last minute I can spare from Cambridge."

His next letter dates from Cambridge about a month later:

"St.John's:
Nov. 6. 1815.

".....But first let me explain how it happened that I did not get a glimpse of you on my way hither. I returned from Brighton not as I supposed I should have done, immediately here. My Father was very unwell and I went first to Slough. After some short stay there I returned in a great hurry to Cambridge, the term having been long begun, and of course the freshmen provided with those necessary appendages denominated "feeders".....I have 4 pupils and among them who but the D'Arblay![x'] I shall reside regularly here, oscillating between Cambridge and Slough, probably for a year or two. By dint of regularity and care, I acquire a sturdiness of constitution wh. will enable me to be of some use in the world.....Indeed I begin to fear I must throw up the profession altogether as a lost game, and I endeavour to reconcile myself to it. But I am not as yet used to disappointments."

Besides coaching he examined again this year, and what a nightmare it proved can be guessed from his resumé to Babbage where he again writes of the "horrors of examinations", having obviously no ambition to become a Moderator.

x' Alexander D'Arblay, son of Madame D'Arblay (née Fanny Burney). He took his Degree in 1818 (10th Wrangler) and died in 1837. See Herschel's Journal of Tour in 1821.

"1815. Dec.18.

"I should have written to you before this but the incumbent horrors of examination have allowed me no time. You are pretty well aware what a job it must be to sit from 8 to 10, or 12, hours a day examining 60 or 70 blockheads not one in 10 of whom knows his right hand from his left and not one in 10 of them knows anything but what is in the book." (cp. James Grahame on his own knowledge).....I have made the new gas jars.....As for functions, I do assure you I have not got up anything about them, on the contrary my knowledge of them and of all other parts of analytics (like Winthrop's breeches which shook his bedmaker's soul with horror but to look at!) is in a lamentable state of dilapidation.....In a word I am grown fat, full, and stupid. Pupilizing has done this - and I have not made one of my cubs understand what I would have them drive at.

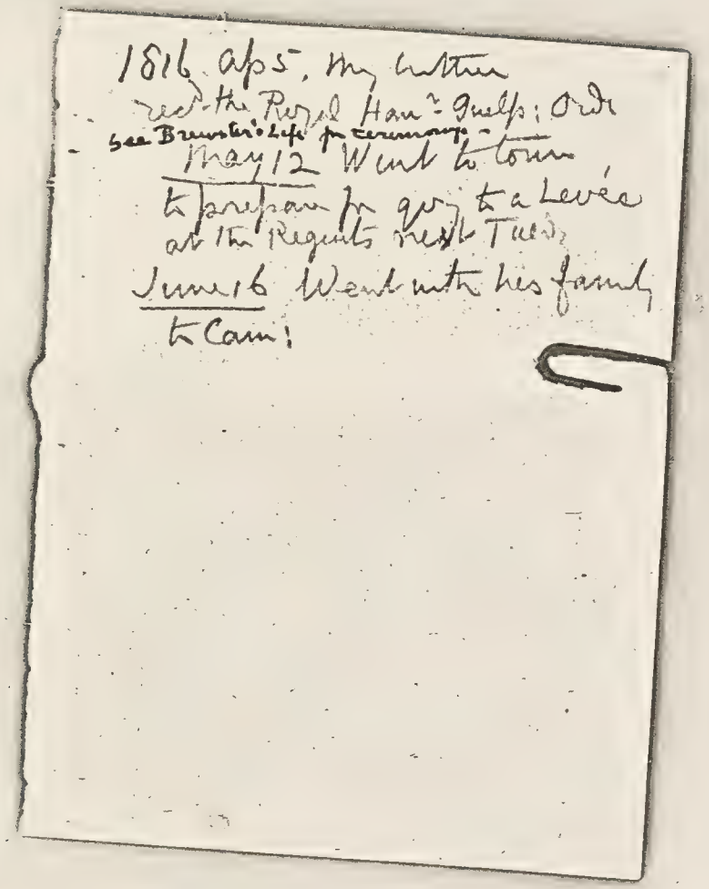
P.S. I have written this in a violent hurry and as you may see with my forefinger nail for a pen. Therefore excuse scrawl &c.....I have the greater part of my papers to look over this evening as tomorrow we go to Wood "to settle the classes". I will go with you to the R.S. on Thursday evening if you have nothing better to do."

During the frivolities of the Christmas Vacation the joint-translation for the Analytical Society surged up again in his thoughts as we see:

To Babbage 1816, 1, 6. (At Slough)

".....As for Lacroix![x'] Peacock and I agree to take each 1/3 viz. Peacock the middle and I the end, (beginning at the chapters nearest to the point of section), so you have to do the beginning, and do, as you value your hopes of future happiness, set about it as soon as possible.....I brought down with me sundry books &c. to cram, but I have done nothing but cram music and those sort of things since I have been here and so I suppose I shall go back as wise as I came (bating wear and tear of knowledge, which does not amount to much). - Thank God however there are other things to do in this world besides getting knowledge, and I do not expect to walk into my grave very much wiser than I am, though perhaps a good deal better - at least there is every reason to hope so - for God knows my goodness is at present in a very improveable state."

x' Translation; published with title-"Vol.I. Transactions of the Analytical Society".


1816 Apr 5. My Father
rec'd the Royal Hanv Guelph: Order
see Brunsw: Life for ceremony.
May 12 Went to town
to purchase & go to a Levée
at the Regents next Tues.
June 16 Went with his family
to Cam:

The vicissitudes of taking the Translation of Lacroix through the press fell unexpectedly on Whittaker. Acting-Secretary of the Analytical Society, for in August the printer's devil hurried to his Rooms to say that the copy lacked Herschel's Appendix. Whittaker dashed him off an appeal for hurry, the printing could not get on without it, and at last the book appeared.

Deighton undertook the first Edition of 1000 copies reckoning it would cost £350 to get out and would sell at 15/- a copy and later when Peacock strolled into the shop, Deighton in person assured him; "We have already sold more than 200 copies." Peacock fired off the glad news to Herschel and added that: "the Hall of St.John's resounds with daily altercations between 'deeists' and 'dottists,' strong symptoms of approaching change for who would have discussed the point 5 years ago? Trust me" he said "the Golden Age of the University is approaching."

The prophecy had proved a true one, when Seventeen years later Sir John Herschel stated in the Quarterly Review:

"The brows of many a Cambridge Moderator were elevated half in ire, half in admiration at the unusual answers which began to appear in the examination papers. Even Moderators are not made of impenetrable stuff, their souls were touched, though fenced with sevenfold Jacquier and tough bull-hide of Vince & Wood. In short, they were carried away by the stream, or replaced by successors full of their newly acquired powers."

Peacock, being one of these successors made an audacious assault on the old notation when Moderator in 1817, at which Whewell's heart failed him, and he murmured to Herschel:

"Have you seen Peacock's examination papers? I have not much hope that he will be Moderator again. I do not think he took precisely the right way to introduce the true faith. He stripped his analysis of its application and turned it naked among them. Of course all the prudery of the University is up and shocked at the indecency of the spectacle. Their cry is: 'Not enough philosophy!'".

However, as Moderator in the following year, Whewell seized his own chance to apply methods for introducing the true faith, so much so that (with Peacock back again) "by 'silent perseverance, the many-headed monster of prejudice" sank exhausted in the fight and examinations took on new life and modern methods.

In 1817 Peacock's summing-up in the following letter to Herschel in 1817 seemed to Sir John Herschel in 1867 to be of major importance. He endorsed it as follows: "Peacock's letter is of consequence as an authentic statement about the Cambridge Examinations." Here is the letter.

(Trinity College, Cambridge. March 4. 1817.
as per postmark.)

"My Dear Herschel,

I am quite ashamed not to have written to you before this time, but I have been so busy and so idle for the last 6 weeks, that I found it almost impossible to write to any of my friends: I have met with a great many disappointments since I wrote to you last, in our schemes of reform and improvements. I told you that White was favourable to the change which I attempted to introduce into the examination, but he soon altered his opinion and ended by opposing it altogether. He was afraid of the comments of the older members and was even persuaded himself that it produced an effect contrary to what was intended. I was consequently obliged to abandon it to my very great mortification: Fallows was at first favorable to the scheme but he also became lukewarm in the business, and Bland opposed it from the first as might have been expected. The examination was much as usual. White and Fallows are entirely of the old school and the influence of their examination was so great as completely to overpower my examination. The introduction of d's into the paper excited much remark: Wood, Vince, Lea & Milner were very angry & threatened to protest against analytics and French mathematics, & I believe that I may congratulate myself as entirely to the success of the Johnians in the examination, for my escape from some public proceedings against me. There are great and radical errors on the examination besides the hurry: the mode of marking the value of different subjects is in many particulars very objectionable: they give little more credit for the solution of a difficult problem requiring both invention and knowledge than they would do for the paltry proposition out of Wood or Vince: the consequence is that no command or knowledge of mathematics can counterpoise cram and rapidity.

Our only apprehensions about the Observatory[x'] arise from Wood: he is hostile to it, but every other person to whom the scheme has been mentioned, patronised it warmly: We will make a trial however & the Grace will be presented to the Senate in the course of a few days.

I have been very indolent for some time & not very well: I have not begun with the examples but expect to commence immediately: I will send you the plates to Lacroix in a few days: I have paid your bill at Deighton's & have the surplus in my hands which I will take the first opportunity to transmit to you: My best and kindest respects to Sir Wm.* and Lady Herschel & Miss B. & believe me

My dear H.
Yours most affectionately
G. PEACOCK.

P.S. Dr. Woodhouse is the other candidate:[x²] Clarke is a great favorite with us here & a man of great talents: depend upon it, my dear H., your support will be remembered & acknowledged: Write and tell me your determination."

By the autumn of 1816 "Lacroix" is about to slide off the stocks and Herschel's insatiable appetite for more work must be appeased. In the same breath with which he announced to Babbage: "I have been writing for Lacroix without ceasing, I am occupied now with the Appendix which we agreed should take the place of that in Lacroix" he sketches out a Gargantuan meal. He intends to produce a complete course of the essential parts of the pure mathematics and he intends to under-

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x' Cambridge Observatory founded 1822.

x² Chair of Chemistry.

* Sir W. H. Knighted 1816 — a note to follow

take a Cambridge Edition of "Newton," always provided that he really does remain in Cambridge: "which I am not quite decided upon".

Not content with that, he told Babbage: "I should like to get to write articles for some of these Encyclopaedias which are on the tapis at present" and finally reeled off wild suggestions to write puffs for a Lottery Office,[x] or join in the lampoons to cry down the Prince Regent or help write hymns for a Methodist Meeting, in fact, Anything for money and at the same time reputation, Anything would do, so long as it rid him of the boredom from cramming pupils such as the young d'Arblay.[x2]

He apologised to Babbage that the Summer Term had passed in one unceasing round of dissipation! These gaities included a family party at his rooms to signalise his M.A. degree.

Lady Herschel and her invariable satellite Sophie dined for the first time in their lives at his rooms in College. All their talk proudly centred round the young hero who had secured a company of 12 friends including Professor Whitfield. Suddenly, also his aged father, who decided to follow his wife up to town by coach and down to Cambridge. (Much exhausted, he returned home alone immediately after the party.)

In the later summer John and his father quietly posted across to Seagrove, Dawlish, the sea-side home of Sir W. Watson, where they often stayed. // During the visit John's mind must have been in a strange tumult from his inability to declare what he liked best and how he should plan his future. In discussion with his father and godfather vagueness came to an end. They evidently wanted him to come to a decision. He seems to have abruptly done so as the shortest way to end the matter. [Disinclination under certain circumstances to come to a decision and then to 'short-circuit' the subject abruptly seems to have been temperamental with him. Mental exhaustion rather than mental indolence. He flogged his willing horse to a stand-still and then leapt off regardless of consequences.]

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x/ Like Charles Lamb.

x2 (A brief life will be here in a footnote - d'Arblay).

— Briefly the facts were

that his father was 78 with much work still planned out, the handicap of old age pressed heavily upon him, and he declared: "Simple as my method is, it is very laborious in its progress."

Presented from this point of view the pathos of the situation routed John's objections, nothing could be more obvious for an impulsive and affectionate son than to throw his additional strength into his father's work.

And yet beneath the surface, his strong affinity for "the Natural Philosophy" continued yet he did not dispute the arguments brought to bear by those two old friends. He merely reiterated that he could not take Holy Orders and thereupon sank into the 'Slough of Despond'. His chief correspondents, Babbage and Grahame, drew their various own conclusions from his sorry condition.

Babbage, surmising matrimony, guessed: "You have some little thought of following my example and truly any woman who can persuade you to do so, must be happy." But Grahame (reading through an appeal to his sympathy with which Herschel had cleverly incorporated his own old nickname of "Hairskull") correctly inferred a revival of that old dilemma between John's plans and his father's plans for his future and wrote:

"My very dear Herschels...

. . . . . groundlessly suspected me of defection... Mercy shall triumph over Justice. I take him back to my arms and call him 'Hairskull' again. His artful interposition of that word pleaded trumpet-tongued in his favour... With regard to the duties of a clergyman, it is not my duty to advise in a matter in which you and your Father seem to think differently."

At the end of the Dawlish visit, father and son returned in a coach-ride which proved as disturbing as John's thoughts. Before they reached home they had been ditched, next, the axle-tree had collapsed, then thoroughly "jumbled" (as the phrase went) they emerged from the Bath coach at Slough, with John in the lowest spirits prepared to assume his rôle of Assistant. (He had completely forgotten the great age of his father - and that it could not last for ever.)

He recollected how his faithful little old aunt spent the years of his childhood and was filled with mournful

forebodings. She endlessly reduced and copied sheets of observations or hurried to and fro between instruments and the lit-up desk to take down her brother's notes. If he replaced her in the drudgery of science, (she being now 66,) such a life indubitably lay before him. He failed very naturally to foresee his own future enthusiasm over the boldness of his Father's enterprise and that he himself would carry on the Catalogue in the Southern Hemisphere. // From our present vantage point we see how completely the genius of his Father, absorbing Caroline Herschel and directing the wifely pride of Mrs. Herschel, dominated the first 25 years of John's life; unless the younger Herschel had been a youth of exuberant animal spirits, or strongly biased towards any one branch of science and wayward enough not to be fitted, by their quite unconscious moulding into the "Procrustian Bed" at Slough, this becomes inevitable. // Besides which we have [illegible] evidence that during the last two years John Herschel must have been giving his father practical help in the casting of his famous reflectors. for in 1814 a faint echo

In 1814 a faint echo from the European turmoil pulsated through Herschel's workshops. A disguised visitor, "Cavaliere de Musignone, grande ammiratore de Mr. Herschel" and accompanied by "Father Maurizio de Verola" wrote his name down in Dr. Herschel's Visitor's Book on or about May 1st 1814. This mysterious foreigner proved to be Prince Lucien Buonaparte who had lived in England since 1810, (quietly watched by special order from George III.)

Now, on about the day that the Count de Provence was driving up from Hartwell to London as "Louis XVIII"[x1] Prince Lucien slipped down to Slough, had some business chat with Dr. Herschel, (who respected his incognito) and then hurried off to Rome to scheme for the imprisoned Emperor Napoleon. The Prince followed up this visit by a correspondence beginning with a note hastily scratched at Harwich, for he had a great desire to own one of Herschel's reflectors.[x2]

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x1 The Prince Regent conducted the Count in state to St James's Palace

"I believe the creams (horses) never had so long a march before, nor had the Regent ever sat back in a coach." Letter of Lady Malmesbury in "Memories of Sir Lowry Cole". (q.v.)

x2 This correspondence is given in detail as an example of William Herschel's thoroughness in all he undertook

(Not printed but put in Appendix)

He wrote from the port of embarkation:x'

From H.S.H. Lucien Bonaparte (Prince de Canino)
to Dr. Herschel. Harvich (sic).

6 Mai, 1814.

"Monsieur,

Je régrette beaucoup de n'avoir pas de temps de retourner chez vous pour jouir aussi longtemps que possible de votre interestante conversation. Je pars demain pour Rome où je vous prie de m'écrire. Sous le nom du Chevalier de Musignono j'ai eu l'honneur de vous voir, il y à quelques jours et de vous parler de mon désir d'avoir des miroirs pour de grands telescopes: voici les demandes que je vous prie, s'il est possible, d'agréer.

Vous m'avez dit que vous aviez des miroirs doubles et j'éspère qu'en faveur de Rome où nous vous admirons beaucoup vous voudrez bien me cèder les miroirs dont vous pouvez disposer. Ils sont déstinés à mon Observatoire de Tusculum.

Voici mon adresse:

au Lucien Bonaparte
Palais Lucien
Rue Condotti
Rome.x2

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x' Signed and the whole written by Lucien Bonaparte.)

x2 [Translation]
"I greatly regret that lack of time prevents me from returning to you to enjoy as long as possible your interesting conversation. I start tomorrow for Rome where I would ask you to write to me, under the name of Ch. de Musignono. I had the honour of seeing you a few days ago and to speak to you about my desire to possess the mirrors necessary for some large telescopes. I should be glad if you could supply me with the following requirements.

You told me you had some double mirrors and I hope that as an exception in favour of Rome, where we greatly admire you, you will let me have such mirrors as you can spare. They are for my observatory at Tusculum.

The following is my address.

To Lucien Buonaparte,
Palais Lucien,
Rue Condotti,
Rome. "

"The wary & sagacious Herschel[x] (who hardly ever made a mistake")

Dr. Herschel cautiously delayed replying until after his summer's recess and then tendered his son's services in the matter, as follows:

From Dr. W. Herschel
to Lucien Bonaparte (Prince de Canino).

Sept. 16th, 1814.

"I have the honour of receiving your Serene Highness's letter...

With regard to a model of my apparatus for a 7 ft. Newtonian telescope I would recommend it (sic) to have one of them ready made. A complete model.... could hardly be made without having also the mirrors and glasses... I have declined making any more but having several mirrors ready made, my Son can see them fitted up under my inspection..."

In the following spring another stranger called to inspect the telescope bespoken, signing in the Visitors' Book as "Chevalier Boyer, nephew to Prince Canino". He came two days before the Battle of Waterloo. Prudence retarded delivery when all Europe seemed in the melting-pot. Whatever the cause, the transaction tarried until July 1816.

Dr. Herschel took infinite care in personally carrying out any enterprise he undertook:

From Sir W. Herschel
to Le Chevalier Boyer, Leicester Sq. No.31.

July 11th, 1815.

"Dear Sir,

The telescope which you did me the honour to come to see is at last very nearly packed up in five large and two small packing cases and will be sent to Messrs Baring & Co. in the course of next week by a waggen (sic) which I shall provide for the purpose.

I shall come to town to see it properly delivered as I did the former boxes containing the 20 and 7 feet mirrors. (Here follows by request a list of contents of these cases and those delivered in August 1815.) ...The waggen (sic) which will bring the packing cases to Messrs Baring, when an account has been taken of their delivery, may then be ordered to the warehouse where it may be unpacked.

x Extract from John Fiske's "Outlines of Cosmic Philosophy" Vol I

I cannot as yet mention the exact day when the waggon will bring these cases but will give a day's notice of it; meanwhile if you could make it convenient to see Messrs Baring you might give them the above account of the Cases as their great weight will require assistance for very carefully unloading them; especially the mirror. I will do myself the honour to call on you when I come to town with the telescope till when,

I remain, Dear Sir,
Yours etc."

Then a letter to the Prince's London Banking Agent:

From Sir Wm. Herschel
to Messrs Baring (Bankers).

July 17, 1816.

Gentlemen,

The large 10 ft. telescope I have been preparing for the Prince de Canino at Rome is finished, and properly packed up in 5 packing cases by a waggon engaged for the purpose. I intend to have the cases conveyed to London next Wednesday the 24th inst. .....I shall be glad to know the situation of the warehouse where the waggon is to be unpacked....."

Finally the Count sums up the proceedings and hopes to have the pleasure of seeing Sir William on his arrival in town.

From M. le Comte Boyer
to Sir W. Herschel. 20 Juillet 1816.

Monsieur[x']

.....Messrs Baring & Co. sont prévenus que le wagon porteur du grand teléscope arrivera à Londres, Mercredi 24, et tout est arrangé pour pouvoir décharger les caisses dans leur magazin. Il serait plus sûr si le le Waggon passait par chez moi, Leicester Sq. No.31 Mercredi prochain de une à deux heures, mon domestique l'accompagnerait au magazin afin d'èviter tout désagrément.

Translation

x' "Messrs Baring & co. have been given notice that the waggon bringing the large telescope will reach London on Wed. 24th and they have made all arrangements for unloading the cases in their warehouse. It would be safer if the waggon came round by my house Leicester Sq. 31. on Wed. next between 1 and 2 o'clock, my servant would accompany it to the warehouse to avoid any difficulties. (Note continued on next page.)

"Messrs Baring et Co. à qui vous avez écrit m'assurent que vous devez venir à Londres le jour de l'arrivée du telescope[x'], je serai extrêmement flatté de vous voir si cette agreéable nouvelle est vraie.

Recevez etc."

In spite of such previous help in practical work John's courage was at a low ebb and he writes to Babbage in a vein of self-pity guarded by none of his customary reticence:

"Slough.

Oct. 10th, 1816.

"I shall go to Cambridge on Monday where I mean to stay but just time enough to pay my bills, pack up my books and bid a long, perhaps a last farewell to the University, to that place endeared as it is to me by almost every tie which usually binds a man to his native spot - the place where my earliest and strongest friendships have been formed - where my character and my ideas have become decidedly fixed - for better, for worse, and which I can never look back to without a full conviction that there is nothing better in store for me and that whatever may hereafter become of me, about which I care very little, I have skimmed the cream of my days already - I always used to abuse Cambridge as you will know with very little mercy or measure, but, upon my soul, now I am about to leave it, my heart dies within me. I am going, under my Father's directions, to take up the series of his observations where he has left them (for he has now pretty well given over regularly observing) and continuing his scrutiny of the heavens with powerful telescopes. The distractions

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x (Note continued from preceding page)

Messrs Baring to whom you wrote acquaint me that you propose to come to London on the day of the arrival of the telescope. I should feel much honoured to see you if this pleasant news is true."

x' The ultimate fate of this telescope cannot be traced.

of my thoughts and the gloom which I cannot drive from me will scarcely allow me to apply seriously to anything."x' [Indeed, he seems almost on the verge of tears.]

Combination Rooms at Cambridge felt the repercussion of this event, Whewell, deeply grieved, wrote to a friend at this time that: "two men of the greatest intellectual powers and attainment I ever saw or ever expect to see have left the University and their departure has made an irrecoverable gap in my enjoyments. Herschel is gone to assist his father whose health is now declining."x'

The decision made, Herschel is headlong in his farewells at Cambridge. He carts himself and a waggon load of chemicals back to Slough. In November goes up to London, takes his name off the books of Lincoln's Inn, sells his law books for £6, and arrives home again prepared to immerse himself in astronomy.

He told Schumacher in a letter to the 'Nachrichten' some years later that he commenced alone in 1816 a Review of the Catalogue of Double Stars discovered by William Herschel and others. He began it all over again five years later with James South, but it is

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x' That the pain was genuine imparted his queer, detached sympathy in a letter written to his own son Alex[2] 44 years later on the difficulties of choosing a career. He describes his own feelings in the following words:

J.F.W.H. to Alexander S. Herschel.

July 6, 1860.

"I suppose your mind has been like a bird fresh-caught in a cage, beating its feathers to pieces against the wires. I have a deep and lasting reminiscence of a something similar in the first year I spent at home after quitting Cambridge for good and all (thank God I did quit it, by the bye.)"

x[2] Richard Jones. 1790-1855. Author of "The Political Economist", who succeeded Malthus at King's College London, was the other man - a friend in common of H. and W.

certain that during this period he acquired much mechanical skill. Under the master-eye of his father he had cast two mirrors for his own 20 ft. telescope.x'

How to do this difficult operation with the antiquated appliances then available had to be carefully detailed by Sir William when these new reflectors became essential. He entrusted John with full working directions.x' Though by this time his dependence on John's help must have been considerable he fully intended, as usual, to hover in person over John's proceedings misdoubting an accident.

Long after his father's death John swept the Southern Hemisphere with these mirrors. In S.Africa he fulfilled a youthful ambition, namely, to publish a work carried out entirely by his own initiative. The reflector he made himself; he continually polished it with his own hands. The 'sweeps' he carried out and reduced himself at the Cape. Later on, with his own pen at his own fireside, in Kent he prepared for publication his countless Memoirs and his Catalogue[x2] of the Southern Hemisphere to be the complementary work to his father's Catalogue of the Northern Hemisphere.

Survey

Although Herschel believed he had bolted and barred the door on Cambridge he presently found that Peacock had put down his name for the new "Observatory Syndic." In a retort to a pathetic appeal from Herschel implying that his Cambridge friends are forgetting him, Peacock wrote robustly that: "No complaint could be more unjust, whatever you may judge from appearances, for no-one can be more the subject of the discourse and admiration, not merely of your friends but of all Cambridge."

The building of the present Observatory[x3] Cambridge owes its existence to Peacock's pertinacity. The authorities pulled down the previous little observatory over the Great Gate at Trinity at the time when Dr. Vince became Plumian Professor and did nothing about replacing this portion of the original Plumian Bequest.

Peacock, newly returned from a Grand Tour in Italy and incited by envy of Bologna's Observatory (so entirely worthy of its famous alumni), fired with a resolution to supply the omission in his Own University, confided his ambitious plans to John Herschel:

"We are now in the midst of projects of reform and I, every day, find reason to lament your absence from the University. Amongst other things I have stirred up some Trinity men to propose a Grace to appoint a Syndic to consider the best means of erecting an Observatory. It will be proposed on the last day of Term. We have consulted with many of the leading men of the University, who enter heartily into the scheme.

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x' From Sir William Herschel to his son:
May 26. 1817. About the casting of a 20 ft. mirror.

"In order to cast two twenty-foot mirrors it will be necessary to make an arrangement when and how to set about it: Whatever is fixed upon it will be necessary first to consult Messrs Devey No.8 Shoe Lane. The last 20 ft. mirror that was cast weighed 128 pounds two will weigh 256.

The mixture is 48 pounds of the clippings of sheet copper to 19 pounds of grain Tin, therefore 192 pounds of copper and 76 of tin will be 268 pounds which will allow 12 pounds for ingates if they think that enough.

Can they melt the copper and tin and cast it safely through a broom into water? or can they pour it with safety into proper iron vessels? either will do.

Can they cast the mirrors afterwards the same day? Have they flasks large enough properly to mould the pattern? it is nearly 19 inches in diameter. They used to cast with two pots heated at the same time in two furnaces, one pot not being large enough to fill the mould.

Can they get so many pounds of clippings of sheet copper and grain tin (for no other will do) to have them ready for us to come as early as they please on Wednesday morning? For, with your assistance, I must be present to see every preparation that is necessary in order to insure success."

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x' See life of J.D. Forbes. May 28th, 1831.
"Mr. Herschel's apparatus for grinding and polishing specula which he does himself with great success."

x2 Published in 1847.

x3 1791.

We intend to include the following names[x'] in the Syndicate: Wood (Vice-Ch: & Master of St.John's) Kaye[x²] (Divinity) Milner (Lucasian) Catton, Cumming (Chemistry) Farish (Nat. Phil.) Vince (Chair of Math. & Astr.: Plumian) Turton (Gen Wr. 1802) and your own name. You will be able to give advice at least, if you cannot attend in person at any of the Meetings."

After many delays he reported progress three months later. "We have at last got our Grace for the Observatory ready and it will be presented on Friday. We are not certain of Wood's intention but we know that if he allows it to pass it will meet with opposition from no other person, there is indeed but one sentiment regarding it, that of shame for the want of it.

It is of importance that you should attend at least some of the Meetings, for your opinion would influence the proceedings of the syndicate most materially. I never can sufficiently regret your leaving the University, we want the influence of high character, for many men will oppose the most beneficial changes when attempted to be introduced by inferior men."

His fears received their justification, the Grace had no success, Dr. Wood blew upon the scheme. Yet, nothing daunted, its backers brought it in again next Term. Herschel hears that Hairland and Catton "fought a hard battle for it, the Vice-Chancellor and that miserable wretch Douglas of Benet's opposed it." It was withdrawn with a promise from the Vice: to allow it to be brought forward on the 3rd Dec.

Dec. 3rd brought success in full measure and in the evening Peacock, full of joy, described the scene to Herschel: "It passed triumphantly through the Senate this afternoon. Wood exerted all his influence against it. Our principal difficulty consisted in getting it through the Caput. We contrived to get

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x' Including Peacock himself.

x² Lord Campbell's Life:
"Dined in Christ's with Kaye, Tutor of the College. It is not easy to imagine the luxury in which the Cantabrigians live, I have seldom seen in any private house a more elegant dinner or things conducted in better style than Kaye presented to us in his College rooms."

all the proper Members there and to interest them in the business, but Webb opposed it for a long time. It was opposed in the Black Hood House by Cannibal(!) Cassacci, (alias Kessich), Wood, Chafy and Blick, an elegant quartette! It passed unanimously in the Lower House. Lax and Webb will oppose the building of an Observatory. Turton and Kaye will not promote it but all the other Members of it are zealous men and true. Troughton has sent an estimate of the expense at which he is willing to furnish the instruments[x'] (about £3,000).

Unfortunately the skill of Dr. Wood in the simple art of procrastination reached a high level. To achieve his purpose he need merely defer summoning further meetings. He acted on this plan. Peacock, deeply disappointed, writes: "We must wait for happier times".

Truly a galling reflection at the age of 26, but the pause was not too lengthy. It came to an end within 3 months because at the only Financial Meeting yet held, Wood's opposition blandly withdrew during the investigation of The Plumian Trust-deed. In turning over its pages they found ample proof that the Plumian Professor is 'ex-officio' Observer, and, as is well known, the Plumian Chair is in the gift of the Vice-Chancellor. Peacock's spirits rose: "All difficulties are therefore over, the 'Vice' enters heartily into the business". With ever-rising enthusiasm Peacock vowed that Herschel might have the Chair if Vince died, "or at all events your name will be of great advantage to you if you should apply for such a situation (considering the great services your venerable father has rendered to astronomy) and you may be sure no person will accuse you of presumption in applying for any dignity amongst us however high."

This argument fell on deaf ears, nepotism never appealed to John Herschel;[x²] he always maintained that a man makes his own name by his own works. He wavered so far as to say that he would not like to begin a canvas before the venerable old man's death. The case did not arise. Vince recovered and by 1822 when the vacancy in fact occurred, Herschel's ambitions no longer lay in College ~~Fellowships~~. Chairs.

Thanks to Peacock's vigorous letters to Herschel a foreign

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x' (Zenith Sector, Mural Circles, an Equatorial and Clocks).

x² "That which thy fathers have bequeathed to thee, earn it anew if thou wouldst possess it."

scientist appeared at Trinity, presenting a letter from John Herschel. It was Biot,[x'] fresh from his international work on the arc of the meridian carried to the Shetland Isles.

He had driven down to Slough with his fellow-workers, Humboldt and Arago, to pay their respects to the aged Herschel, Thence, armed with a letter of introduction to Peacock he posted down to Cambridge, to hear more about the proposed Observatory. The University was delighted by his talents and candour and freely discussed the topic with him. Peacock reports that "from a pure love of science he seems anxious for its erection, indeed he is wide-minded enough to think that the study of Newton is neglected in France and projects a series of lectures on the Principia."[*] The vigour of this Frenchman throws up in strong relief the returning apathy of the Observatory Syndic: at which Peacock could hardly contain his irritation. In fact, when Herschel canvassed him for the new Astronomical Society in London he exploded in a good healthy letter of impatience, abusing every one: "I shall not easily forgive Catton for becoming lukewarm in the cause of the Observatory of which he was formerly so zealous a promotor. With all my solicitations I have not yet been able to get another Meeting of the Syndicate, such sluggishness and indifference would provoke a saint."

This proved to be the darkest moment before dawn. In May he proclaimed jubilantly to Herschel: "The 5 Graces were passed to-day. The main object is secured. The Building Committee can now be formed." Herschel's name appears. His actions in London included interviewing Troughton to secure his consent to construct the necessary instruments, and inducing Rennie, who had designed the Cape of Good Hope Observatory,

x' There was mutual admiration between Biot and John Herschel, for Herschel, understanding the immense difficulty Biot found in getting tourmalines for his experiments, generously sent him 8 magnificent specimens immediately after his own return from an inspiring visit to Paris in 1819.

* To this Herschel's satirical comment to Babbage is: "I suppose Biot means to get the credit of having written the "Principia" as there is nobody there who will detect him, the work having become obsolete in those parts!" J.F.W.H. to C.B.

to pass half a day at Cambridge to advise them on the foundation afforded by a gravel subsoil. In particular what depth the foundation pillars must be driven into their site near the gravel pits of Madingley (which they had bought from St.John's.). "It is a noble site" says Peacock "but rather too distant, a mile from Cambridge. Troughton promised to send us the plans of Greenwich Observatory but it never came. If you or Sir William Herschel could give us any advice on this subject it might be of great service to us." By Dec. 1820 Peacock said "We have determined the Meridian, which may be made to pass through Grantchester Church without sacrificing any material advantage on the situation (of the instrument). The distance of Grantchester Church is about 12000 ft. a good and sufficient distance for a Meridian Mark."[x']
.....I expect to be able to see you, I wish to learn many things respecting the Observatory, more particularly on the form and dimension of the rooms.
.....I have no doubt that the University will adopt any plan upon which we agree, this is pleasant and just as it should be." Rennie's plans for the Cape Observatory met with general approval, yet Catton "expressed such alarm about the smoke from the buildings passing the meridian" that they decided to put the design up to open competition. Mr. Meade won it and by 1822 they laid the Foundation Stone.[x²]

It was in 1822 that Herschel delighted that disciple of jollity, his friend Rev. Richard Jones, with the following description: "We had a fine jovial journey to Cambridge. Peacock grew inspired as we neared Alma Mater, and chanted Metastasio to Opera Airs. This was too much for Whewell's nerves who proposed the bold Anthem of Old King Coule which was accordingly sung in full chorus to the amazement of all passers-by."!

To revert to 1816, John has settled into the collar at home and is convinced he may tackle mathematical work besides his father's practical astronomy. Whether Looking around

x' A model (in the Vestry) of Grantchester Church shows (1935) this Mark, a perpendicular iron-stand with a ring on the top, in situ on the leads of the tower. (Destroyed by a storm (about 30 years ago) early in the 20th century.)

x² Cambridge. July 3, 1822. Herschel to Littrow: "I have seen 20 men at work on the foundations of the new Observatory."

for a point of attack, Peacock full of his projects for wholesale reform in the University demanded of him a new Algebra to be undertaken at once. Herschel began it/ Whewell's amiable query about it exactly hit off the unrestrained fecundity of Herschel's brain. One need but suggest a topic and vast schemes immediately race through his mind.

Almost at once more work reached him by the London Coach in the shape of a leather trunk filled with MSS. of William Spence's* Mathematical Essays following on an appeal forwarded by John Galt, (the novelist) that Herschel will look through the package

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x' W. to J.F.W.H. "How does your Algebra go on? From what you say I should suppose you feel ideas crowding upon you as fast as you can put them down and therefore that it will be unlike anybody else's Algebra."

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* William Spence. 1777-1815. A precocious child. From the age of 4 he learnt anything with ease; then like other boys of 12 he tried his hand at making fulminating powder with the usual startling results, and by the age of 14 the boyish nick-name: "Our Philosopher", picked him off most aptly.

His father's first idea to launch him into the world as a manufacturer found him serenely docile but quite uninterested till that evening when Mr. Struthers and he tried to build up their own Magick Lantern. This involved mathematics and disclosed to Spence his natural bent but though he remained with Mr. Struthers till 1797, at his death mere business ideals could not hold him and he returned to his native village of Greenock there to polish up his periods at a local Literary Society, "as a man of science, not unacquainted with letters." His ambition to be remembered only as a mathematician bids fair to be the case, thanks to his Mathematical Essays edited and commented on by John Herschel in 1818 (though originally read before the R.S. of Edinburgh 15 years previously). The paper drew attention to his inventive ability in Analytical Mathematics and indicated the heights attainable through the superior methods in use amongst continental geometers.

His marriage to a lady well-known to him for many years took place but a few days previous to his unexpected and sudden death at a small Glasgow Inn where they only put up for one night on the honeymoon trip to England. His widow and the novelist John Galt (Spence's life-long friend) prevailed upon Herschel to edit the posthumous works.

and help his widow to a decision about publication.x' At first he took but a languid interest, meeting with nothing very striking beyond perhaps an attempt at a new theory of the Differential Calculus, but within a fortnight he is on fire.

"All my analytical mania" he tells Babbage "is returning glowing hot from its perihelion. After wading through immense heaps of trash and beginning to despair, the day before yesterday, I struck upon an unfinished Essay full of the most beautiful properties of transcendents. I devoured the Essay with avidity. The field it opens is immense. I mean to recommend its publication and everything else I can find on the same subject in the strongest terms.x2 Meanwhile an idea has struck me, I cannot on so small a piece of paper develop this idea but we must get another Volume of the Analytical Society out. It will be capital sport. What do you say? Write me how you like the scheme. At all events let us get out another volume." This they never did.

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x' Herschel appended a note to the Second Essay which explored a new and promising field. Though extremely mutilated and imperfect, he included it in the volume of "Spence's Posthumous Works" brought out by himself with an explanatory Preface (Op.18) dated Dec.10, 1818.

x2 From Herschel's Article in the "Quarterly Review" written in 1833.— "The appearance of distinct works on subjects of pure analysis result from Woodhouse's publications. The most remarkable of these is the 'Essay on the various Orders of Logarithmic Transcendents' by the late W. Spence of Greenock, the first formal essay in our language on any distinct and considerable branch of the integral calculus which had appeared since Hellin's papers.....A premature death carried off in Spence one who might have become the ornament of his country in this department of knowledge. His posthumous Essays which were not however collected or published till 1819 prove him to have been both a learned and inventive analyst. He appears to have studied entirely without assistance, and to have formed his taste and strengthened his powers by a diligent perusal of the continental models. In consequence he was enabled to attack questions which none of his countrymen had entered upon." These isolated Essays of Spence are apparently mere fragments of an extensive design which should embrace in one view the whole system of analytical operations and of which the ground work is partly traced out in Spence's Preface of his previous work: "Essay on the various Orders of Logarithmic Transcendents."(1808).

Then he turns vehemently upon Whewell: "You see I am all agog. For the last fortnight I have been analysis mad. I will tell you the symptoms. Three days without food or drink and almost without clothing further than what the absurd decencies of civilised life render indispensible, three days and nights sleepless and heedless of my way did I wander up and down the neighbourhood. By this time (it is a preparation I invariably undergo before I sit down regularly to invent) the god had full possession of my mind and body, the grosser parts being dissipated, purged away and prevented from obstructing his influence. I returned, I sat me down, but could not write, vast ideas revolved in my mind but found no vent, I was like.....a roasting apple going to burst.....the children stand round in silent expectation till someone more impatient than the rest settles the point by thrusting in a pin. However I really have read and written more in the last fortnight than ever I did in twice the time in any other part of my life and I advise you to go and do likewise."

That extravaganza, beneath its mass of fact and ludicrous banter conceals his desire to get into mental touch with Whewell. Being obviously checked by an uncertainty about its reception, he continues: "This, O Whewell, is the first letter I ever wrote unto thee, and by the strange, rambling incoherent style of it, thou mayest be tempted to wish it the last." Yet it struck a sympathetic cord and their correspondence never failed till fifty years later Whewell's fatal fall from his horse, robbed Herschel of his friend and Trinity College of its Master[x1].

Owing to unavoidable delays Spence's MSS. never got into the Printer's hands for two years yet some of the delays were Herschel's own making. When he complains that the "day" has not enough hours he includes night-hours spent with his new 20ft. reflector, daylight-hours required for a Paper on Circulating Functions[x2] and whole days spent inside the laboratory built for him by his father at a discreet distance from the house. Moreover, Dr. Young's intention to form an "Egyptian Society" for the publication of hieroglyphics attracted his notice. In chasing this train of thought he linked up again with an old Hitchamite[x3] who directed him to the Babylonish bricks at Trinity. Intent on

x1 Whewell was Master of Trin: Coll: Cam: 1841-1866

x2 Op.16. Cited by Sir H.Davy when awarding for the first time to Herschel the Copley Medal.(1821)

x3 Renouard. Arabic Prof. Cambridge.

capture, he persuaded Peacock to get them copied for him. After this success, Egyptology retired into some pigeon-hole of his memory. Besides these minor attractions he snatched at the longed-for opportunity arising from a most complimentary letter or "feeler" by David Brewster[x1] to Sir William Herschel. It referred to the able papers contributed to Phil. Trans. by young Mr. Herschel and implied that he was on the lookout for promising young writers. Sir William handed on the letter to his son. He replied by return of post (catching Brewster at Peebles) with the result that Brewster's "Encyclopedia" ("Edinburgh Encyclop.") obtained two articles from the younger Herschel: "Isoperimetrical Problems"[x2] published almost at once and "Mathematics"[x3] not required till later in 1818.

In a desultory way he also kept in cut an Article "A Collection of Examples of the Application of the Calculus of Finite Differences"[x4] examples applying the general principles laid down in his Appendix to the Translation of Lacroix. This would have been his own contribution for that further volume of the Analytical Society conceived by him in a sparkling moment of inspiration, but ardour among the other young conspirators had died down. True, Peacock submitted for Herschel's criticism a possible article (agreeing to cut out a diatribe against Leibnitz and fluxions) but he wrote bleakly to Herschel: "the Analytical Society is unfortunately in very bad odour in consequence of the numerous blunders in our last concern."

In truth, 50 years later Herschel candidly disowned one of his own early contributions, remarking: "I was very green at that time."

Then delays blocked their further efforts at publication. Peacock suffered not only one of his fits of "helpless indolence" (his own expression) but his horse must needs pitch him off in a distant journey and his injuries delayed his return to Trinity. Next, the printers declared they had no suitable type. In an accident to the coach, their parcel had disappeared, though, with professional optimism, they announced a further dispatch "daily expected". Postponement became inevitable.

Eventually Peacock and Whewell published individually their own Mathematical Textbooks. Babbage and Herschel sent up Memoirs to the Royal Society and we find some of the other members of the Society as

x1 Editor of "Edinburgh Encyclopedia".
Sir David Brewster 1781-1868. Buried outside S. wall of Melrose Abbey.

x2 Op 15. pub 1817

x3 Op 19 pub 1819

x4 Op 14

footnote

X1] ...."It may be mentioned that the modern conception of Algebra began with the British 'reformers', Peacock, Herschel, de Morgan, Babbage, Gregory, Boole. What was a somewhat heretical novelty when Peacock published his Treatise on Algebra in 1830 is today a commonplace in any competently written schoolbook. Without this realization that algebra is of itself nothing more than an abstract system, algebra might have still been stuck fast in the arithmetical mind of the 18th century."
Men of Mathematics by E. T. Bell. p.488.]

X' See contemporary cartoons of the Vice-Chancellor and Fellows wafting through the College Courts amongst the ballooning curves of their vast sleeves and lengthy silk gowns.

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authors of separate mathematical publications.

Thus disappeared the Society which had owed its possibility of corporate life to the sociable character of E. Ff. Bromhead, a Trinity Undergraduate in whose rooms, contrary to established custom, men from various Colleges forgathered, linked together by their common interest in mathematics.

The reputation of the Society gave it such a family resemblance to its nursing father that an extract from the pen of Whewell may fitly ring down the curtain: "We have had Bromhead staying here, he was as usual absolutely overflowing with theories, more particularly mathematical; the rapidity and extent of his generalisations is absolutely overpowering. They expand before you like a cannister of gunpowder which should explode whilst you hold it in your hand."

Fortunately Peacock, as Moderator in 1817, 1819 and 1821, ensured a posthumous glory for the defunct Society. Convinced that the University Examinations required revolutionary treatment, he, with Whewell and other members of the late Analytical Society, bestowed this, though not so forcefully as to satisfy the long-sighted vision of Herschel. He wrote in Dec. 1819, when Whewell's "Mechanics" appeared, that it conformed too much to present taste and too little to the coming spirit of the age to be a Lecture-book worthy of the next half-century when the chrysalis stage shall have been thrown off.

Herschel, as we know, (at Peacock's urgent request) had sketched out an Algebra on a vast scale and discussed it freely amongst his friends, who, knowing their man, foresaw a work entirely unlike any other Algebra and warned him not to deter undergraduates by the difficulties. At the same time they noised abroad his intentions to publish and Peacock assured him that the force of his name must overcome any opposition to its adoption in the Schools. It availed nothing to stress that point of view; Herschel's thoughts persistently soared beyond the elementary details of school Algebras, the work slipped to one side more and more frequently and finally faded away. Eventually, it fell to Peacock to write the volume bound in dark green cloth which lay for over half a century on every schoolmaster's desk.

Whewell quite as strongly as Peacock desired the speedy return of Herschel to the University; "It is

one of the greatest curses of Cambridge that all the men you love and admire, all of any activity of mind go forth into the world and are lost to you."

At every contested Election he hoped in vain to see Herschel sailing through the Courts of St.John with all the pride and ample pinion that bear a Master of Arts thither on such occasions." In fact not a soul to talk functions with nor anything else worth talking about. Obviously, the little nauseous cabals and University politics chafe him. At which Herschel turns the tables on him and begs him to consider his own position at Slough. Only by keeping holy one chamber of his mind and enduring no intrusion within its precincts could he exist in his solitude. In fact, he broke out: "Hang Mathematics, write to me soon, tell me of your pursuits and of what affords matter of interest to you. We have too many points of contact for either of us to fear leaving the other behind. But, perhaps you may be like Jones who says: 'If you want anything of me, write to me, but if not let it alone.' If so, say so and the point is soon settled."

Whereas the younger Herschel might be occupied by the practical details of watching the night skies of Slough, yet, from this inner chamber of his mind his thoughts ranged in hopeful exploration through the uncharted areas of 'Natural Philosophy'. At the dawn of the 19th cent a single enquiring mind might still usefully pioneer in the divergent matters of Chemistry, Physics, Optics, Mathematics, Astronomy and certainly Meteorology.

His out-put between 1816 and 1822 affords proof of this roving outlook, amply endorsed by public opinion at the University. They coveted his intellectual companionship, The younger Fellows kept watchful eyes on their elderly or infirm associates. They began to convass young Herschel immediately an unfavourable report arose respecting the health of a Professor! In this manner they implored his consideration successively of the Chairs of Mathematics, Astronomy and Geology (only the obstacle of extreme youth had stood in his way when Chemistry fell vacant in 1815.) They would gladly have settled him in the Lowndean Chair but for the longevity of Professor Lax.

Herschel's intellectual rovings drew him into

—Herschel's correspondence with David Brewster, that is to say, drew him within the radius of the 'Northern Lights' (a nick-name adopted by the graceless Babbage for the publishers of the Edinburgh Encyclopaedia) they printed his Isoperimetrical Problems in 1817 and the article "Mathematics" in 1818. Working on the latter under the galling limitations imposed on him by his distance from London he wrote in fiery haste to Babbage at his town-house for more books of reference:

"I am in a great strait. I have brought the history of Mathematics to the beginning of the last century with infinite fag and have now only to May 3rd to finish it in, I have no access to any of the transactions of learned Societies. If this is not a bore I don't know what is." (The alternative he suggests is sufficiently diverting. Should he have recourse to the "combinatory analysis" and, "by impressing accident into my service find names for discoveries and discoveries for names, and having arranged them so as to look pretty, call it 'A History of Mathematics'?)"

Prying further into this letter (assuredly intended only for the eyes of Babbage) we read of a bizarre process of thought to which Herschel ascribes some of his inspirations. He tells Babbage: "I have often derived assistance from reading down the 'Table of Contents' of some extensive work, it suggests a variety of combinations with great rapidity, like this new Kaleidescope of Brewster's, and I have more than once been indebted to it for a good idea, a thing one would not be very ready to confess but for the good of science."

Another reason why he lusted to have done with this Encyclopedia article proves to be a special development of Physics which decoyed him away in her path. "I have been repeating Brewster's experiments on Mother of Pearl and have noticed a great many phenomena which he has overlooked.....When I have done with this confounded 'History of Mathematics' (if the sun will only shine this summer) I shall enter with all the means I can command into the field of physical optics."

With the article arising out of his "Appendix to Lacroix" still in his table-drawer awaiting [illegible] final revision[x1], a further interjection betrays the active research progressing in his new laboratory; "Pray, do you know whether Oil of Cassia or Oil of Cinnamon[x2] are

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[x1] Published by Cambridge Phil: Soc: in 1820. Title Op.28. On reduction of certain classes of Functional Equ^ns to Equat^ns of Finite Diff^ces

[x2] According to the Brit: Pharma. eutical Codex Oil of Cassia is extracted from Cinnamomum Cassia while Oil of Cinnamon is extracted from C. Zeylanicum. See Op 66. Account of an Experiment on Oil of Cassia.

the same or what plant Oil of Cassia is extracted from?"[x]

At last, having produced over 300 pages of printed matter for this "confounded" History of Mathematics and [illegible] Encyclopedia, he [illegible] in June 1819 in [illegible]

"The Edi[illegible]
'Exhibiting a View
'Natural Philosophy
'Practical Mechanic
'Fine and Useful Ar
'Professor Jameson,

Dr. Brewster
politan selection
Wallace, Biot, Bar
addition to their
sulphurous Acid" s
name is coming to
his celebrated fat
into a brand-new pa
(See note)
tography.

Resulting from
paper he himself ir
his new acid (substance) in the
power of "hy
but from
... closely examin
He deliberately ex clud
chemistry his first love as his
often it seems incumbent on
him to supplement the flagging
efforts of his interfering old father
Already in 1815

p 85.

but as we have already seen in 1816 he deliberately

In this paper ... Edin: Jay dormant [illegible] the essential ingredient in the art of photo. when it [illegible] astonished the world in 1839.

Wm Thomas will insert a sentence before the above to emphasise the "melting like sugar" & in fact advertise the article itself. Then talk about the coming art.

photography became a commercial possibility.

"It was essentially not commercial minded."

the same or what plant Oil of Cassia is extracted from?"x'

At last, having produced over 300 pages of printed matter for this "confounded" History of Mathematics and safely packed it off to the Edinburgh Encyclopedia, he tackled a Chemistry paper to appear in June 1819 in Brewster's latest venture, grandly entitled, "The Edinburgh Philosophical Journal" "Exhibiting a View of the Progress of Discovery in" "Natural Philosophy, Chemistry, Natural History," "Practical Mechanics, Geography, Statistics and the" "Fine and Useful Arts. Conducted by Dr. Brewster and" "Professor Jameson, to be continued Quarterly." —

Dr. Brewster opened magnificently with a cosmopolitan selection of authors including Berzelius, Wallace, Biot, Barlow, Beaufoy, & Humboldt. — In addition to their papers is the article "On the Hyposulphurous Acid" submitted by John Herschel. His name is coming to the fore on subjects unexplored by his celebrated father. In this paper, quietly inserted into a brand-new periodical published in Edinburgh, [illegible] for the art of photography.

Resulting from the discovery announced in this paper he himself in 1839 detected the practical use of his new substance in the processes of photography. The fixing power of "hypo"x' is too well known for it to be described, but from the moment he announced its property to the scientific world, photography became a commercial possibility. [illegible]. All his note-books bearing on chemistry and crystallography should be closely examined. (Had it not been for tradition urging him into the affectionate path of filial piety there is strong supposition that he would have made chemistry his life's work.) Already in 1815 it will be remembered he had felt himself sufficiently accomplished in the subject to consider the Chair of Chemistry after the tragic death of Smithson Tennant.

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x' The fruits of those experiments Dr. Brewster publisned in his second venture: "The Edinburgh Journal of Science" eleven years later on. Op.66.

x² Now known to chemists as "Sodium thiosulphate".

Chap III

Towards the end of the year 1818 Babbage's flood of high spirits needed to overflow beyond work on his Calculating Machine, the writing of scientific pamphlets or social engagements. His domestic life usually oscillated from his house in Devonshire Street to Dudmaston Hall near Bridgnorth, his wife's early home in Shropshire. Her brother, W. W. Whitmore M.P. had recently inherited the property and the journey there took them two days, spending a night en route with Mrs. Babbage's uncle Mr. Isaac the banker of Boughton Park[x] near Worcester.

One of Babbage's notable achievements had been to induce this brother-in-law to light up Dudmaston Hall with the new burning gas, thus to be in the vanguard of enlightened men. Now the notion seized him to rush off to Paris for his first visit and to drag off Herschel as well. This would really be a red-letter day if successful. The deed was done by dint of a well-laid train of suggestions, with the help of £120 consigned to Paris by Babbage, coupled with the fortunate fact that Mrs. Herschel's health remained stable.

They set off soon after the New Year of 1819, taking 2½ hours to cross to Calais. The first evening in France they saw "a whistling man giving imitations of birds and castenets with his lips", after having had their Passports filled up and money made available for Paris. Though travelling light, 'en garçon', it involved a good four days by both public day-coach and the night diligence from Amiens, before, trotting up the long avenue of trees, they entered Paris through the Neuilly gate.

Babbage immediately called on Biot to ensure their entrée to the Institut de France[x2]. Herschel had the duller job of promptly removing themselves bag and baggage to a better Hotel.

This visit to Paris did wonders for young Herschel. He went out there a young bachelor inclined to be farouche and shy, still on the threshold of life, not

x¹ Now better known as the "Cricket Ground of Worcestershire. Cricket Club"

x² See Bonington's Water Colour in Brit: Mus:.

realising his powers, obviously not knowing his own level. In France under the wing of Babbage, the married man of the party, he tested himself in the school of life. To his great advantage, judging from the praises of his young lady friends Miss Grahame and the Misses Wilson[x'] These James Grahame adroitly passed on mentioning: "His delightful improvement in person and address" and so forth.

Be that as it may, in Paris he met as equals all the greatest continental savants. He could no longer doubt but that great possibilities lay before him, yet he retained his natural modesty of manner while acquiring intellectual poise and a 'savoir faire' which had pernaps been lacking. He held his own and returned a man.

Biot, as a Member of the Bureau de Longitude, in the course of Babbage's call, invited them to dine one day to meet a few Members of the Board, mentioning Laplace himself, (of whom Davy had remarked that "one could not look on his physiognomy without being convinced that he was a very extraordinary man". He also included Poisson, for Laplace had spotted this alert & pleasant young man when on the look-out for talent amongst the scholars at the Polytechnique. There were to be several more celebrities.

Next day they walked down to the Institut near the shelving banks of the Seine. Here they found themselves amongst an amazing crowd of French scientists. Merely to copy from his Diary the names of the great men with whom he spoke or to whom he was presented, shows that he met the very 'élite' of the day.

He was presented to Vauquelin, brilliant as a Lecturer on chemistry though singular in manners and countrified in habits, and to Thénard his pupil, equally uncouth and provincial but an outstanding chemist and the closest friend of Gay-Lussac.

To Gay-Lussac he was also presented by his fellow-investigator Biot for the two had made the crucial experiment on the limits of magnetic forces still town-gossip because Gay-Lussac, to lighten their balloon as they sailed along, had seized his chair and hurled it out. It crashed to earth near a little peasant, minding goats; suddenly aroused and

x' Professor Wilson's family was much attached to the Herschel family. They lived in Kensington Square till he removed to Glasgow in 1819, Prof. Astronomy. Miss Ann Wilson died in June 1819 and was buried at Upton, leaving Lady Herschel a legacy of £10.

seeing no one, she dropped on her knees and screamed out at the chair fallen stright from heaven, "Un miracle du Bon Dieu!" Laplace

Herschel's first introduction to the author of the "Mécanique Céleste" took place at this séance.[x1]

He made his bow to Berzelius the Swedish chemist, by good fortune that year paying a long visit to Berthollet to whom Herschel also bowed. The aged Berthollet was frequently reported to have walked up the 5 miles from his house at Arcueil to the Institut in Paris.

Following these presentations Herschel was led up to Legendre, very tall - very fine Although Legendre's original work with Cassini and Méchain and his junction of the arcs of meridian between Greenwich and Paris seemed ancient history, yet it was but contemporary with the writings of his hero Lacroix who also had evidently made a point of being present to meet the young Englishmen. This introduction, though the last, is the most absorbing.

At length they see in person the author of works which had so indelibly affected their thoughts; 'tis pity that the Diary is silent over their encounter. The Joint-Secretaries also acknowledged their bows, Cuvier the anatomist and Fourier the amiable and benevolent professor of Physics (to whom in the fullness of time it fell to write the Institut's "Eloge" on John Herschel's father.)

There is no further information in his Diary but James Grahame, exasperated at such reticence, drew forth from Herschel's unwilling pen a hazy picture of those days in Paris.

Grahame naturally enquired what Herschel thinks of: "the interior of domestic Society in France? How do you like the women?"

Herschel's lofty and somewhat impersonal reply[x2] that "travelling is admirably adapted to show a man what he is good for" is most unsatisfactory. Grahame wanted to compare French and Scottish scientific circles, their

x1 Of Laplace, Herschel said later: "he is a good soul and worth all the rest of them for the mere simplicity of his heart." See also "Quarterly Review" No.99, 1833 in which Herschel reviews this work.

x2 Grahame to Herschel three years later. July 1822. "It was you who first put travelling into my head by the description you gave me of the pleasing and improving effects in awakening observation and rekindling relish that a visit to France had on your mind."

pay, their style of living. "In this little capital" (he writes from Scotland) "every man thinks himself obliged to live up to the very summit of his income. Not a philosopher in Edinburgh sees his friends without preparing for them as if they were gluttons and drunkards. Jeffrey[x1] is less vain of his critical celebrity than of the 32 kinds of wine he keeps in his cellar."

Herschel's jejune reply about his Parisian friends warranted Grahame's little dig at John's normally undemonstrative letters. It is a thumbnail sketch of Herschel in his salad days: "I hope you correspond with some of them, though to you who are so reluctant to express your feelings to a friend of your own country, it must be much against the grain to write to a Frenchman in his own way." Finally he asks why Herschel omits to mention "the strong impression Babbage says was produced on you both by their horrible indelicacy and even indecency? Why give me all the light without any of the shade. Really you might as well write a history of Adam and Eve and leave out the Fall!"

Herschel may have been hazy about matters of "Society" in Paris but he soon wrote to Sir William Watson betraying acute envy of the "ardour prevailing in matters of Science in Paris;" Moreover, Laplace and Berthollet by inviting the two young Englishmen into their eclectic little "Societé d'Arcueil"[x2] aroused not only their chronic dissatisfaction with the chilling torpor of routine in London but also stirred that "sense of loneliness and desertion arising from want of sympathy experienced by those few individuals who attempted to induce a small amount of scientific movement in this country."[x3]

Such "individuals" included the dynamic Babbage (who commented on the methods of the Scottish Royal Society in the summer of 1819) and certainly included John Herschel whose active mind seemed like quicksilver in a dusty surrounding, hampered and dragging a tail.

The above quotation, uttered a quarter of a century later was a renewal of the resentful thoughts earlier

x1 Jeffrey, Judge Advocate.

x2 Soc: d'Arcueil

x3

63 When in Edinburgh unsuccessfully canvassing for the Chair of Mathematics. 1819.

harboured by Herschel, He crowned them with the emphatic addition: "I know I have been blamed on a former occasion for expressing this opinion but it is not the less true."
These lines occur in his Address to the Royal Astronomical Society on the death of Francis Baily (in 1845) one of the Foundation Members. Baily exhibited strong views on the need of such a Society in his Preface to Cagnoli's Memoirs, published in 1819. Sir John quoted from it as follows:

"It is much to be regretted that in this country there is no association of scientific persons formed for the encouragement and improvement of astronomy' The formation of an Astronomical Society will be attended with the most beneficial results." – "It is thus", Sir John's Address continues "that coming events cast their shadows before them. But it would be ungrateful not to associate with the name of Francis Baily that of Dr. Pearson[x1] as having at or about the same time made the same suggestion." We know now that some such ideas had glowed for many years in the mind of Dr.Pearson, accordingly the publication of Baily's ideals fanned these embers to a flame. With his a dozen other minds torched up as well. On Jan. 12th, 1820 John Herschel's diary contained the historic entry: "Dine at the Freemason's Tavern to meet Dr. Pearson and other gentlemen to consider of forming an Astronomical Society".

On the 15th Jan. 1820 the Sub-Committee, including Dr. Pearson, Herschel, Babbage, F. Baily and others had a long morning in the rooms of the Geological Society outlining the prefatory "Address". Afterwards Herschel took the coach down to Dr. Pearson's house in Sheen, where he dined and slept a couple of nights to settle the details of this Address of which he was the author.

By way of recreation they tested each night the double-image micrometer about which Dr. Pearson proposed "to say a few words" at the opening meeting. (His "few words" eventually blocked the available time during the whole of the two earliest Meetings!)

"16th Jan: Spent morning at Dr. Pearson's, Babbage came about 1 o'clock. Read over and arranged "Address"

x1 Dr. W. Pearson (1767-1847) F.R.S.-Observatory at Sheen 1811-1821. Thence to S. Kilworth. Enthusiastic amateur astronomer. A founder of R.A.S.

for circulation with the notice of the formation of the Astronomical Society. Dined and returned with Dr. Pearson and Babbage to the Meeting of the Committee in the evening."[x']

The 3,000 words composed hurriedly by Herschel received a deal of hammering into shape by Baily and Babbage. Finally their emended edition appeared. Herschel opined that Baily had made "sad work of that scrawl of an Address I left with him ..... made me say what my soul abhors."

Throughout January and February 1820 all public functions were cancelled by reason of the mortality in the Royal Family.[x2] During this pause Babbage threw his energies into the organizing duties of a Joint Secretary and eventually wrote to Herschel: "Jan. 21st, 1820. The Committee having prepared the rules, it became necessary to form a House-List of the Officers. I carved out for you the office of Foreign Secretary but before I had communicated to anyone my ideas, the first Officer named was yourself! I was desired to convey to you the wish of the Committee that you undertake it, which is hereby conveyed together with my advice, if any such be wanting, that you do accept it. Perchance (for who can predict your thoughts?) an old-fashioned lady called 'Modesty' may interfere, if so, assure her that you were not proposed because you united all requisites, possible and impossible, but because, if you were not, a worse must have supplied your place."[x3]

Herschel (who was a good linguist) accepted: "As the Committee think me capable of undertaking the duty of Foreign Secretary, I shall certainly not refuse to undertake it, but I would suggest that when the foreign correspondence of the Society becomes rather extensive it will be much more advantageous to have a member resident in London to fill that office."

The struggles to elect their President appear in a further letter to Herschel when the Committee had met again; with Mr Secretary Babbage presumably in the Chair: "1820. Feb.6. Dear Herschel, We (the Committee) dined yesterday at Capt. Colby's to consider about Officers.

x' J.F.W.H's Diary.

x2 Duke of Kent and King George III. [1760-1820.]
Father of Queen Victoria. Jan 23rd 1820 Jan 29th 1820

x3 At the Tower of London.

I had previously at the desire of the Committee offered to Davies Gilbert[x1] the presidentcy which he had accepted with apparent satisfaction.

"In the morning I received a note from him stating certain reasons for wishing to decline taking any leading part in it. We are therefore at present undecided about this important point and four names were mentioned yesterday in the Committee: Earl of Macclesfield, Marquis Graham, Duke of Somerset, Dr. Wollaston.

"Mr. Moore proposed the first and the last, (for learn, the Dr. is half converted, the shot from his father's paper winged him[x2]) Marquis Graham was proposed by myself in a neat speech.

"The Duke of Somerset was proposed by Mr. Colnbrook, who read a letter from him, in which he expressed his approbation of the Society and a wish to join it on his arrival in town."

During this suspension of business Herschel gave himself no rest, Whilst Babbage's reports were arriving, the days hastened by, filled with his own omnifarious interests. At first it was copying the Address with a canvassing letter dispatched to Peacock and other friends (all of whom eventually capitulated and joined the Society). At the same time he continued a rather acrimonious correspondence with Brewster in defence of his own Articles on Crystallography recently published in Phil.Trans. and by the new Cambridge Phil. Soc., Whilst this subject occupied his pen, the Master of St.John's invited him to write a considered letter to Lord Palmerston, (M.P. for the University of Cambridge,) emphasizing the qualifications of Fearon Fallows in his application for the position of Observer at the new Observatory now building at the Cape of Good Hope. Herschel added his testimonial and Fallows received the appointment.[x3]

Then Herschel plunged into a correspondence with Dean Grettan to further the cause of his musical friend

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x1 Afterwards President of the Royal Society.

x2 "This diligent astronomer, the Rev. F. Wollaston, suggested a systematic examination of the heavens." } 2

} 1 The paragraph from the Address composed by Herschel that "winged" his son W.H. Wollaston was

x3 And the youthful Palmerston apparently added the "Cape Observatory" to his bag in Cambridge Patronage that year.

Dr. Whitfield of Trinity, who desired to become Cathedral Organist at Hereford. These two had passed many melodious hours in each other's rooms and Whitfield held appointments in both Colleges. Naturally, for this new venture, he asked Herschel to exert his influence with the Dean of Hereford. Herschel succeeded but Whitfield only arrived with his family at Hereford in August. To his dismay he found that the Dean lay dying. He wrote hot upon the event to announce the calamitous news to Herschel: "We arrived completely jaded, and here, I wish to God, I could end my letter. I have the agony to inform you of the death of the excellent Dean at 11 o'clock last night. On our arrival we were told he could not survive the night. It has given us a shock we shall long feel, not even to have seen him."

Herschel, himself much moved, passed on the information to another old Hitchamite, Adam Gordon of Stocks:[x1] "Aug.12, 1820. I was inexpressibly shocked on receiving a few days ago a letter from Hereford informing me of the death of our venerable old friend the Dean ... The good old man. Not a month before his death I had a letter from him pressing me to come and see him at Hereford and overflowing with expressions of almost fatherly kindness.

"Old Hitcham is now desolate, its Master no more, and its inmates scattered over the world; 'serrons donc les lignes, aimons-nous d'avantage, nous qui y restons, le vide n'y paraitra plus.'

"When I received the news I rode over to the old place and I will confess that while the recollection attached to it claimed a drop of regret, I reflected with more complacency and warmth than ever on the friendship of yourself and one or two more Hitchamites of our day which I have been fortunate enough to renew or retain."

Herschel also snatched at this breathing space to polish off a further Paper (Op.29) and dispatched it for the Cambridge Philosophical Society with a covering letter to Fallows, mentioning that if the aged Vince (Plumian Professor) died, he should offer as a Candidate, since the Chair combined all the astronomical positions in Cambridge.[x2]

At length the adjourned First Ordinary Meeting of the new Astronomical Society took place:
"1820. Feb.29. Evening. Attended the meeting of the Astronomical Society at which my Father was voted as

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x1 See Diary. "Aug 23. Accompanied Gordon & his relative Col L.C. Gordon of the 71st to Stocks wt Hemel Hempstead. Saw Harrow on the way & went on School House."

Vice-President, Babbage one of the English Secretaries and myself Foreign. NB. The Duke of Somerset, President; to whom, with the other Secretaries, I was introduced by Dr. Pearson." (J.F.W.H's Diary).

Within a fortnight the Diarist notes that these arrangements are all polarized by "the part Sir Joseph Banks thought proper to take respecting the Astronomical Society" in persuading the Duke of Somerset to resign the Presidentship at the First General Meeting on March 10th, when neither of these young Secretaries was present. (Babbage, because he was ill, Herschel, merely because building operations at home for a new laboratory engrossed him.) Babbage got at the Duke first and wrote to Herschel. The amazed Herschel tried to reconcile them: "He, (the Duke), has made himself in my opinion, very contemptible in allowing himself thus to be made another man's puppet. What evil spirit possesses Sir J.B. it is beyond my power to guess. I could not have supposed him capable of such narrow-mindedness. Do you think the circumstance of Moore having been our ostensible leading man hitherto is at the bottom of it?" Herschel added a laughing apology for such unfashionable promptitude as answering by a return post-bag! for he was replying to pages slashed off by Babbage, vigorous in gossip and facts, about the aged Sir Joseph Banks especially a lively version of a fracas between Daniel Moore and Sir Joseph. About the Astronomical Society's own contretemps, Babbage merely writes:

"1820. March 18th. I was so ill that it was utterly impossible to attend either the Council or Meeting of the Astronomical Society last Friday, March 10th. This was unfortunate, as it was our first Meeting. Much to the surprise of us all, the Duke of Somerset has withdrawn so that we now are considering who is fit to be our new president ... We suspected there might occur a little ratting at the commencement but hitherto only the Duke and Jack Fuller* have evanesced."

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* Jack Fuller = John Fuller 17- to 1834. A wealthy, eccentric & very massive batchelor of Brightling in Sussex. M.P. for that County and acquired his money from his Sussex iron-furnaces. Some of his fortune bought him plantations in Jamaica. When slaves were to be emancipated his fury & indecorous conduct in the House caused him ("Hippopotamus" for short,) to be forcibly ejected by the Sergeant-at-Arms, with assistance! And yet his disposition was benevolent, witness various local donations and the village tradition that his Observatory in which he dabbled in Astronomy was built to enable Herschel to avail himself of it if, and when, he should visit him. Also he founded the Fullerian Professorships and caused himself to be buried beneath a huge pyramid 20 feet high, erected by himself 24 years previously at Brightling.

for details in Appendix

In fact the two young friends, neither of them yet thirty, failed to trace these senile outbursts of fury to their true cause.x' Sir Joseph Banks had fulminated in turn against the foundation of each new scientific society; nineteen Fellows of "his" Society, as he liked to call it, joined this newest body, besides most of the distinguished foreign astronomers: in fact, he growled out at Sir J. Barrow:x³ "I see plainly that all these new-fangled Associations will finally dismantle the Royal Society and not leave the old lady a rag to cover her;" , Though Francis Baily boldly queried whether a man is forever precluded from joining another scientific society because, forsooth, he belongs to the Royal Society (and many Fellows silently agreed with him), yet Sir Joseph Banks inspired such awe when he fixed a man with his piercing black eyes that he effectually torpedoed the appointment of any but a practical astronomer to their Presidential Chair.

Happily, Sir William Herschel's contribution in February 1821 of his "Revised Star-Catalogue" to the Astr: Soc: warranted their invitation to him, the outstanding astronomer of the times, to accept the position. And yet of Somerset Sadly enough between the lines of this Memoir, a farewell to future work may be discerned, and the Society felt sufficiently honoured by his acceptance of it in a purely nominal capacity, Indeed, John deplored his advancing years and the failure of his prodigious powers in a letter to James Grahame at about the same date: "My father, I lament to say, is gradually sinking into a state of such extreme feebleness as to render him almost incapable of any enjoyment. He suffers no pain,

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x' "Sir J.B. had become a great martyr to the gout and for 14 or 15 years previous to his death, he lost the use of his lower limbs so completely as to be wheeled by his servants in a chair." (Sketches by Barrow). And In that very week whilst Babbage and Herschel chafed under his autocracy, Sir Joseph Banks became seriously ill and died, June 19th, 1820.

x² Feb. 9th. Anniversary Meeting Astr: "My father elected President; myself, continued office of For: Sec: Dined with Society at Freemason's Tavern. Only my Father's health being drunk. I made a speech of thanks. Broke up at 12." J.F.W.H's Diary.

x³ Sir John Barrow. 1764-1848. Second Secretary Admiralty 1804-1845. [Specially interested in Arctic discovery.]

but a perpetual giddiness in the head deadens his faculties and perceptions and he bears these ills of age with a saint-like tranquility[x1]. An honour was lately conferred on him, which in his present state he would willingly have evaded had it been consistent with propriety and with what he regards as his duty to the Science he professes. The Ast: Soc: have elected him their President. As he is quite incapable of performing the active duties of the office it was conferred with an understanding that it should never be expected from him. They have chosen me their Foreign Sec. an office which promises to be no sinecure, but which I do not regret as it will be the means of bringing me in immediate contact with most of the chief scientific characters in Europe. At the same time this, and the part I have taken in the establishment of the thing itself, oblige me to devote a very much larger share of my time to the study of the details of Ast: Science than my natural inclination would lead me, and, (what I find particularly harassing in conjunction with my duties in the Council of the R.S.[x2]) keeps me almost perpetually on the road between London and Slough, so that I can hardly be said to have a permanent residence in either."

When the question regarding a Motto for their new Society arose, Herschel and Babbage amused themselves and wasted much ink and paper on the matter. Herschel's point of view on Astronomy drew from him the following reflection:" "Quo mens atque astra vocant" is not a bad motto ..... the glory of Astronomy does not consist in the mere noticing and recording objects but in combining appearances and tracing the order and Harmony of the University. The mens therefore is as essential an ingredient as the Astra in our Motto."

On the death of Sir Joseph Banks, Herschel threw himself vehemently into the election of a new President after the 40 years' reign of Sir Joseph Banks at the Royal Society. Could he and his contemporaries carry

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x1 Shortly afterwards Sir William received a serious shock in the news from Hanover announcing the death of his dear brother, Alexander Herschel.

x2 Appointed on Council Nov. 1820 Royal Society

through a revolution to obtain the election of a scientific leader for a scientific body? Instead of a "gentleman of literary and scientific tastes and habits, whose rank, manners or fortune fit him for becoming the centre round which the learned and ingenious of all ranks and conditions may most easily and unreservedly group themselves."

John Herschel attached great importance to the sequence of events in this election, especially his own part in it, and recorded many particulars:

"No sooner was it known that Sir J. Banks was so ill he could not survive, than Sir H. Davy set out from Paris to be ready in London to canvass for the vacancy. He arrived in town on the 6th June 1820 or the day before (as I heard from Brande whom I dined in company with at South's that day).

"On Monday 19th June at 3 in the morning Sir J.B. died. On Tuesday morning Babbage called on me and told me of it. We talked of his successor and agreed that Wollaston would be the best man-only we were not aware of his intentions.

"We called on Wollaston and found him at tea; he declined offering himself, said he had convinced himself it would interfere with his little pursuits. B. and I then agreed to drag him into action, nolens volens; we agreed therefore to procure promises among our friends. Upwards of 100 letters[x1] were written and on Thursday morning I called early on Wollaston mentioned what we had been doing and entreated him at least not to act against us. I rode over to Pearson at East Sheen whom I found confined to his bed from a bruise, & got a promise of his assistance. Ditto Brunel[x2] at Chelsea whom I found working at his new process for stereotyping newspapers.

"Davy, when he first heard it suggested that Wollaston might oppose him, made light of it in conversation with Kater who spoke of the hopes entertained by 'Wollaston's friends'. 'And pray,' said Davy, 'who are Wollaston's friends?' 'Babbage, Herschel and myself', was Kater's reply. Davy seemed to take this as a personal affront, and speaking of it to someone, remarked in strong terms on 'the conduct of junior members in disturbing the peace of the Society'. Davy taxed Wollaston with canvassing by his friends. Wollaston assured him

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x1 ~~All written by hand by their friends.~~

x2 ~~Thames Tunnel~~, architect & engineer of the Th. Tun. Sir Mark Isambart Brunel. 1769-1849.

it was not by his concurrence and taking Babbage aside asked him to promise in my name as well as his own to canvass no more. B. hesitated, on which Wollaston said: "Will you give me this promise if I say I will accept the office?" On this condition (amounting to a formal declaration of himself as candidate) B. gave the promise.

After this, however, Wollaston's scruples again returned; he wrote to Davy declining to proceed further. After this the Duke of Sussex and Duke of, Somerset successively resigned and Prince Leopold[x'] declined also. So Davy will, I presume, walk over the course."

But until the Annual Meeting on November 30 Wollaston occupied the Chair as President, saying he had "no objection to accept it until they could pitch upon a proper person."

Sir Humphrey Davy "walked over the course" in November and the "conduct of the junior members" only bore fruit 28 years later when the election of Lord Rosse carried out their point.

"Herschel's Diary Nov.30, 1820.[x1] Attended a meeting of R.S. (Annual Election). Sir H. Davy elected President. NB. Voted for Sir H.D. because of the dirty attack on him by an anonymous author of a letter canvassing Lord Colchester. Otherwise meant not to have given a vote." *See Kater's.

Herschel to Babbage Dec.19th 1820. "It is strongly asserted that O. Gregory is the author of that virulent attack on Sir Joseph which lately appeared in Tilloch.[x2] As the Astronomical Society is brought in there, it is making the Society a party to the affair if he remain on the Council next year. I have no vast respect for the memory of Sir J. Banks, but if a man have aught against him, why wait for his death to spit his spite? There is something dastardly in it."

Ah! "Those were the days, the palmy days"!! Even in Philosophical Magazines lampoonists flourished like the green bay-tree. x3.

x1 Dined with R.Soc: at Crown & Anchor. Walked to Kater's with Dr.Wollaston and Dr.Somerville. Met Mrs.Somerville & Mrs.Kater there. (NB. Herschel's first recorded introduction to Mrs.Somerville.)

x2 In the Phil:Mag: & Journal (Tilloch) 1820. Article: "Review of some leading points in the Official Character & Proceedings of the late P.R.S." p.251: "Tired as I now am of recording examples of Sir J's vexatious, or indecorous or malignant treatment of individuals, let me proceed to alleviate my own fatigue by adverting to his illiberal treatment of different (footnote continued on next page)

x'Uncle of Queen Victoria. Husband of Princess Charlotte. King Leopold I of Belgium. 1831-65.

Their other cause for disturbing the peace of the Society was because, (these were Herschel's words): "Now or never is the time to lay it down as a principle that the President shall be refreshed every four or five years." But his zeal for reform fell on stony ground, this principle never materialized in their day. Nevertheless with the election of Lord Rosse, the tide turned away from the privileged non-scientific element amoung the Fellows[x'] and left a high-water mark of socially distinguished persons to die off. Their further elections could only crowd out the real working man of science. A strong reforming party arose, dealing first with the elections of Fellows and eventually limiting the President's term of office.

But Herschel was only a potential firebrand (unlike Babbage who joyously exploded comfortable elderly men). He lamented the well-known angry dispute still pending between Arago, a peppery Frenchman, and Dr. Pearson, (not very fluent in idiomatic French) and he set himself to soothe their ruffled feelings: "Called early on Baily to get Papers etc. for Kater to enable him to explain to Arago the misunderstanding between him and Pearson. Howsver he had done it on a hint from my verbal statement last night."

Note continued from preceding page:-

Societies..... At the commencement of the present year 1820 several promoters of Astronomy in theory and practice instituted an "Astron: Soc^y" An interesting address explanatory of the objects of the Society was drawn up and actively circulated ..... Copies of this Address, so well received in every other quarter were presented to Sir J.B. It will be natural to enquire, how did he receive them? I really regret to say that their appearance called forth the most puerile and pitiable jealousy ..... He summoned the Council of the R.S. ("his Council" as they are still denominated) laid before them this Address and with a countenance half-tinged with melancholy, half with anger, asked what was to be done? ..... Sir J. next expostulated with the Duke of Somerset who had consented to be President of the Astron: Soc? and...had actually attended one of the Meetings...His Grace in consequence withdrew from the new Soc.

One remark more and I have done; much has been said of Sir J.'s hospitality...As to his tea-parties... Doubtless the researches and discoveries of Hutton... Herschel...Davy...Brewster and very many others, (the glories of British science) would have had all their... distinguished celebrity although Sir J.B. had never gratuitously dispensed a single cup of tea." (Anon. Probably Olinthus Gregory).

x' Even in 1841, the following lampoon appeared in The Times "'Tis all jobbing, job, job, jobbing
Oh, 'tis all jobbing in our House at home
One jobs for place, another jobs for self,
Some jobs for power, we all job for self.
For 'tis all jobbing, job, job, jobbing!
Oh 'tis all jobbing in our house at home.

This spirit of regenerating reform influencing the whole atmosphere breathed by younger Englishmen, permeated to Cambridge, Herschel's other hunting-ground. The year 1820 marked the foundation there also of an important Society. carry on

The "Cambridge University Philosophical Society"[x1] with Herschel amongst the Foundation Members originated through the leaven of youthful energy imported into the sybaritic Common-rooms of Trinity and St.John's College by Sedgwick, Peacock, Whewell, Herschel and others. Indeed, Adam Sedgwick, the first Secretary, for all his wild exuberance of spirits, found they had to navigate some heavy weather before they reached harbour. Many of the Dons laughed at them, some shrugged up their shoulders at this "undisciplined exhibition of the younger men and the larger number looked on them as they do on any other external object, with philosophic indifference".

This indifference was perhaps not wholly to be ascribed to philosophy when we read such a letter as the following:

"At Trinity College we dined in Hall. Everything on a grand scale. The revenues of the College exceed £30,000 a year. After partaking of a sumptuous dinner which began at 3, we retired with the Fellows to the Combination Room where we sat soaking port till 8 or 9. Cards were then introduced and the entertainment concluded with a magnificent supper." At the smaller College even worse befell. "As soon as the cloth was removed we all retired to the Combination Room where there was such a drinking bout as I have seldom witnessed. Alma Mater lay dissolved in port, of course those who remained to the last were excessively tipsy...Several of the Fellows continued reeling through the streets for a great part of the night."[x2]

However, Sedgwick rightly counted on the zeal of his members, on their active spirits and not least on their vitality, to arouse his dozing elders.

The earlier meetings betrayed their amateur management judging from Herschel's criticisms. He read a paper[x3] and performed experiments at the April Meeting in 1820[x4] but, accustomed to the severe formalism of his

[x1] Now, the Cambridge Philosophical Soc.

[x2] Letter by Lord Campbell.

[x3] Op.30 On the Rotation impressed by plates of Rock Crystal on the plane of Polarization of the Rays of Light.

[x4] Diary April 4. 1820 "Hearing of Dr Milner's death set off for Cambridge and declared myself a Candidate."

London Societies he told Babbage "the Meeting (entre nous) was very irregularly conducted and rather ridiculous but practice makes perfect and it was said to be admirable compared with what had gone before". He probably foresaw some such fiascos when he told Whewell during its formation that the Rules seemed to authorize a system which, "if permitted, I cannot conceive the possibility of the Society holding together long or maintaining its respectability." However that may be, by the end of the year, Sedgwick trumpetted forth to Herschel the proud news of more elections, notably "among the rest, the Rev. J. Wood D.D. Master of St.John's! This was more than we expected and certainly more than Dr. Wood intended last year. It seems as if we had risen in his good opinion."

In reality Herschel had great aspirations for this fledging, he wrote to Biot at the Paris Observatory "You will be pleased to hear we have lately formed a Philosophical Society at Cambridge. I have reason to hope the meetings will bear some resemblance to those of that admirable institution, the "Philomatique Soc." (paris), some of which I attended (by your kind introduction) last spring." And in a paragraph to Sir David Brewster upon the wide future which lay before it he also mentioned the "new institution just formed in our University, from which I conceive great hopes that that learned body will at length come forward (in the way they ought long since to have done) and take an active part in the advancement of science." Finally the astute Babbage with his ear to the ground desired the prefix "Member of the Cam: Phil: Soc:" to be included as a qualification by Brewster when backing him at that time for the Chair of Mathematics at Edinburgh.

To revert prompts once more to Herschel's return from Paris in the previous year. At home he found, amongst familiar landmarks, an upheaval in progress. With some consternation he heard that his dear cousin Sophie, a gentle girl of considerable charm[x1], his constant companion in childhood, and a very frequent resident with his family, intended to marry Thomas Beckwith, and by the way she was faced with the alternative prospects of constant visits from her half-sister Mary. Changes should at once be envisaged in his life at home. Yet all that had to stand aside. A passionate enthusiasm for research rekindled in Paris, had seized him, his thoughts & his quill-pen concentrated night and day on the topic of "Light", in special reference to the optical phenomena exhibited by Mother

[x1] See Letter from Dr.Somerville to Dr Herschel.

of Pearl.[x1] Could he then conceive of any more lovely wedding present than the Mother-of-Pearl box shimmering with rainbow colours, rapturous to gaze upon, with which he presented his cousin?

Hearing of this gift Grahame, who had always noted the poetic fervour of Herschel's scientific thoughts, mildly rallied him, asking whether he had ever felt like Daniel Bournouilli who, report said, "became so overpowered by a thrill of rapture when meditating on one of the discoveries of Newton that he felt he had risen to a conception of heaven?"

Sophie married on March 11th, 1819 from her home in Kensington . John gave her away on behalf of her widowed mother and she went to her new home in Bedford Place, soon making it a pleasant and useful pied-à-terre for John in his frequent visits to town. But next year ominous clouds gathered round this happy household, in April 1820 anxiety forced the truth from Herschel. He wrote to Babbage: "The last accounts from Mrs. Beckwith were again unfavourable. Oh! my prophetic soul! - But I will not think of possibilities."

Though Mrs. Beckwith had the best treatment of the period under Dr. James, the birth of a son in May sapped her small reserve of strength and she weakened daily. John kept a stiff upper lip and wrote in irony: "she was much better for a week or ten days but it proved a mere delusion kindly sent to make the reality look blacker". Full of premonitions he goes on to tell Babbage how he is trying to keep his thoughts off the subject for Mrs. Beckwith continues "daily but not rapidly declining." He says, "I have been chemicalizing a good deal. Indeed I have done little else except scour the country on horseback, which I generally do 5 or 6 hours per diem. This morning I visited a very strange old place, a farm-house[x2] formerly the residence of the Norris family which remains in the same state almost precisely in which it was in the reign of Henry VI. It has rather

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x1 Op.24. Published by Brewster in Vol II of his Edinr Phil: Journal. July 1819.

x2 Ockwell, about 6 miles from Slough.
Diary Aug.14 1820. Rode with Nelson to Ockwell to Mr. Pyle's, a farmer. NB. To take Wilkie there. NB. To send Pyle a pair of Elk's horns to hang up in the hall.

excited (or revived) a dormant taste for antiquarian knowledge in my chaos of a brain. The present possessor "takes a pride in making himself acquainted with the history of the building and preserving it as much as possible in statu quo."

Evidently he thought well to improve his riding since Last April when he was in Cambridge. His horse bolting at the sight of a terrified woman and child, had thrown him and he had had to be bled and so forth. His diary had the brief entries: "Bought and paid for a bay mare £25. Called on Sergeant the tax-gatherer to enter bay mare."

In October his cousin's dangerous illness obliged him to cancel his plan to visit Cornish Mines with Babbage: "I regret this exceedingly as I had promised myself a great accession of geological as well as mineralogical knowledge."[x1] Thereafter, distressed and patient, he awaited the end in London. He jotted down sorrowful little facts in his Diary: "Saw Sophy once more at Bedford Place". Next day Nov.1st: "Saw Mrs. Beckwith in the morning and sat with her some time." He relieved the emotional strain of that last day by sending short notes across to Babbage in Devonshire Street: "Nov. 2, 1820. Thursday morning; Mrs. Beckwith still lives but was so much worse last night that we look hourly for her dissolution." Then briefly in his Diary at midnight: "Mrs. Beckwith died at eleven o'clock at night."[x2]

Throughout the hours of dawn he eased his soul by writing to Babbage: "Mrs. Beckwith expired this evening with little or no pain and almost without a struggle. Her husband (though deeply afflicted, yet having long expected it) retains composure enough to see it in its true light as a release from suffering. My Mother was dreadfully affected at first but on the whole bears it with much more fortitude than I had hoped and I succeeded in persuading her to leave town tomorrow. I thought you and Mrs. Babbage would like these particulars." He told how, earlier in the evening, the street outside resounded with news just

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x1 Letter to Adam Sedgwick, Oct.1820 from J.F.W.H.

x2 [illegible]

x3 "The family physician... Antimony & calomel were his favourite remedies - which he often used with the most fatal success, in fact it was always a most question whether he displayed his skill most in getting people into the world or in getting them out again" Extract from Recollections of J.A. Hardcastle M.P. circa 1820.

reached London of Parry's successful return from the Arctic[x'] "Had it been a day or two earlier, the intelligence would have rejoiced her even in Death. Parry is the brother of her dearest friend, and the pride and hope of his family." Next morning John drove away with Lady Herschel to Slough. He remained by her till official duties recalled him to London and mercifully delivered him from those emotional scenes. He says in his Diary that he had to see Pond at Greenwich and procure his signature to various certificates for the Astronomical. - "Returning by water saw accidentally and by mere good luck, two great launches. The 'Hithe' Indiaman 1200 tons and the 'Southampton' frigate 60 tons (built on a new construction to avoid being raked, with a round stern like a tower.[x2]"

Further official duties Babbage undertook. Herschel arrived at home for the funeral of his cousin in Upton Church, numbed by a great grief. It clung to him even later when he tried to frame a letter to Grahame: "She is the friend with whom I had grown up from my earliest youth and who filled a sister's place in my affections".[x3] He broke off, sorrow choked his thoughts and he turned the subject. With this

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x' Sir Edward Parry 1790-1855. This return is one of the historic events of that year. Parry sailing in the "Hecla" penetrated farther N.W. than any of our seamen hitherto. Enthusiastic mobs shouted themselves hoarse over it, and in two days Parry became "Commander Parry" and at once the Royal Society elected him a "Fellow".

x2 Sir R. Sepping F.R.S. (Surveyor to R.N.) Copley Medal 1818 & See Phil: Trans: for his Article on Ship-building.

x3 Grahame, firmly anchored by the prescribed tenets of his creed, answered as follows from his own safe harbour of belief: "I see, from the very event you deplore, how friendship is the desire of man, how sure & resistless is the purpose of God. How can I teach you to feel that you will meet with this dear friend again? Should I even wish that it were in my power to impart this happy feeling to your Heart? Is it not in far better hands? Pray to Him, dear friend, that you be not inflicted in vain. He alone can teach you so to sorrow that you be not as others who are without hope. To consider you as truly Christian how happy would it make me." For once Grahame missed his mark, not understanding that Herschel was so constituted that he could not put into mere words spiritual concepts which transcend formulas. (See Herschel to Grahame May 2nd, 1824.)

sentence the book closes on the saddest period in the whole of John's life.

A third link with childhood parted a few months later. In March 1821 the shadow of death darkened the pathway of his elders. Letters to William and Caroline, arriving tardily across the North Sea, told them that their dear old brother Alexander had died a fortnight ago in Hanover. John remembered his uncle as "a mild, amiable, unsuspecting character with too much feeling for his peace of mind". He had little shrewdness in business matters but William, with brotherly generosity insured his comfort for the last 6 years of his life. Indeed Alexander by his mechanical aptitude rendered invaluable services to his scientific brother whenever he took a brief holiday from his duties in Bath.[x']

The sadness at Slough continued. The home circle, centring as it did round Lady Herschel's motherly feelings, suffered with her a further shock on hearing in April that poor Sophie's infant had only survived his mother by six months.[x2] It was perhaps fortunate that recently James South had made acquaintance with Herschel. He stimulated afresh John's astronomical zeal through "his intelligent and careful observing". He was a large loose-built person, a perspicacious individual with great ambitions in the world of astronomy, but seems to have "flown from his centre" when honours did not come his way as rapidly as he expected. Later on, he gave up using his magnificent equatorial in a pique because he said "Struve has reaped the golden harvest among the double stars and there is little now for me to hope or expect." But we are still a long way from that sad debâcle. In these earlier days at Blackman Street (Southwark) Herschel was continually

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x' Alexander Herschel was principal violoncellist for almost 50 years at the Town Concerts of Bath.

x2 In Upton Church a mural tablet commemorates Sophie Beckwith and also little "Thomas Herschel Beckwith" her son. d. Ap 29. 1821.

§ J. South (date)

§4 R. L Waterfield's 100 Yrs. Astr.

in and out of the house, the strength of his devotion disclosing itself in a confession to Grahame[x']: "I am now at the house of an astronomical friend, Mr. South, one of the finest fellows among my acquaintance, a truly generous-hearted open character. My acquaintance with him is not of long standing, but is much more intimate than is usual with me at so short a date. He has some noble instruments and we have arranged to go through a series of observations on my Father's double stars which will be a work of much time and labour and we have resolved to spare no attention to approach the utmost limit of attainable accuracy[x²]."

Previously South had come down to Slough, [illegible] full of hope, they got the old 20ft: reflector into some sort of working order[g³] but only for a very short session: Herschel says "We got the 20ft. on to the Moon and Saturn. I can now believe anything of the effects of reflectors of great aperture... Though the Moon was very bright, four satellites were plainly seen without attention, while a 7ft. would show but one, readily, and more by glimpses. I never saw the Moon itself so exquisitely shaded and with such an air of solid reality as in that telescope, though the mirror is by no means a good one being infested with a thousand aberrations... During the evening's observations it took it into its head to fly from its centre, and as I was trying to get it back into the Meridian the frame literally came to pieces. I have got an astronomical mania on me at present which, I suppose is more intense than it otherwise would be, from the impossibility of gratifying, though I have been giving

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x' March 8, 1821.

x² Op. 44

g³ See South's R.A.S Presidential speech on presenting Caroline Herschel with Gold Medal 1828. "He who has the honour to deliver this hasty Address feels no slight gratification in having been present on 1st June 1821 at the last observations with the 20ft. reflector in which Miss Herschel was engaged. He remembers also, not without regret, but with becoming gratitude that for his improvement, the mirror used on the occasion was inserted, for the last time, in the tube, by the hands of Sir W.H."

directions to a pack of carpenters for erecting a new 20ft. telescope. The old one is completely off its legs. However I am not sorry, for it will afford my Father some occupation: though able to do very little he is quite a new man when superintending some little repair[x']."

In the glow of this new friendship Herschel and South worked at their "observations on 380 Double and Triple Stars" with two of South's instruments[x²]. They removed the small 5ft. equatorial (with a Dolland object-glass) which South hitherto used on the roof of his house in Blackman Street, to a site hard-by, and only 40ft. from the traffic [illegible] over London Bridge.

Yet, by bedding its piers 7ft. deep on a mass of Yorkshire flag and surrounding this with cemented brickwork[g³] their precautions against tremors succeeded: "Stars pass with perfect regularity along the declination-wire while the heaviest waggons are traversing the street". They proved its constant accuracy by "running a star from one end to the other of the declination-wire backwards and forwards." A pitiful oil lamp, with a "neat contrivance by which the adjustment of light can be conveniently effected by a long handle hanging down the polar axis", supplied the lighting for their delicate work!

Unfortunately for Herschel the sudden friendship with South and his wife (Herschel often visited them for long spells) entangled him in some of South's rows,

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x' J.F.W.H. to Babbage 19 Dec. 1820.

x² South and Herschel in the first paragraphs of this joint Memoir to Ph. Trans. explain their intention." It was naturally to be expected that owing to the imperfections of the micrometers (circa 1779 and 1780) and the novelty of the subject, many errors would have crept into the measurements of Sir William Herschel's two Catalogues. Accordingly in 1816 a second re-examination of the measures was entered on by his son and some progress made with it, then, at Mr. South's suggestion it was determined to work in concert. This was commenced in March 1821. Meanwhile Struve at Dorpat and Amici at Modena commenced a similar undertaking... "the coincidences of our results with Struve's are striking." The Joint Memoir bears the date Phil.Trans. 1824 and it may be remarked that James South received the Royal Society's Copley Medal in 1824 for his share in it.

g³ Described in detail in Op.44.

A peace-loving citizen found himself let in for angry scenes, delightful to South but most painful to Herschel. Twice he intervened. On the first occasion after South got at loggerheads with Dr.Pearson, Herschel patched it up: "Contrived to get Pearson and South to shake hands after the Chronometer Club but fear it will be but a hollow reconciliation". Next he identified himself with his friend against Dolland in a dispute over a bill, then Babbage told him straight out: "I decidedly think you are wrong. You have allowed yourself to be thrust forward in a quarrel which is not your own[x']."

The first novelty of Blackman Street worn off, Herschel quickly found new worlds to attack leaving this substantial undertaking 'in petto' for progress during the moonless nights of the next three years.

His ~~extraordinary~~ vehement vitality and intellectual buoyancy carried him forward to an assault on Chemistry, presenting a notable Memoir to the R.S. on Iron[x²], besides further papers on Light-rays, considered first for theoretical purposes in their passage through rock-crystal[x³] and again for practical purposes by the aberrations in manufactured glass.[x⁴]

Next his Diary jumps over to Galvanic Experiments in Electricity and Magnetism. These he carried out at the Royal Institution with their Great Battery. "It consists of 2000 pairs and took 90 lbs. Nitric Acid to charge it." (Experiments on the magnetism or non-magnetism of pure Electricity)"[x⁵] As regards any published work on these enquiries he reserved his first formal expressions of opinion for the Bakerian Lecture delivered at the R.S. in 1824.

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x' Herschel agreed with this verdict in later years.

x² Op. 34. The separation of Iron from other metals. Phil: Trans. Vol CXI 1821.

x³ Op. 32 Extraordinary refraction.. by.. Apophyllite. Cam: Un: Phil: Soc: 1821 Vol I. P^t II

x⁴ Op. 33 Aberration of Compound lenses & object-glasses. Phil: Trans: Vol CVI 1821. (Awarded Copley Medal. 1821)

x⁵ "These experiments were made by me bringing with me a spiral with polarizing plates at either end, a ray to be polarized at A. and to try for signs of deposition at B. I believe Faraday got his notions from these experiments." Additional note by J.F.W.H. 1870."

1821 at the Castle led off with a "Windsor Ball". Such social engagements, closely interwoven amongst all his pursuits of knowledge this summer, were generally noted in that useful "Collin's Diary" which Babbage, of all people, had induced him to embark upon this year. It sporadically keeps us up to date for the next 51 years. Until his death a 'Collins' always lay in the drawer' ready for him. His recording fervour ebbs and flows with tantalizing uncertainty, breaking off sometimes even in a graphic story such as the following:

"Dec.11th, 1820. Attended Mr. Clarke's funeral (Minor Canon of St.Paul's). He had been 58 years connected with the Cathedral and in consequence had all possible honours paid him. A very fine and solemn effect the chanting of the requiem by torch-light in the centre of the dome, when quite dark. The vaults were illuminated too and presented —" [Finis]!

And it is even more tantalizing to be referred to a still undiscovered, "elsewhere", for an account of his meeting Sir Walter Scott at a dinner-party chez Miss Joanna Baillie.[x']

In this year he made his first public speech (he replied for his Father at the Astronomical's Dinner in the Freemason's Tavern) Festivities continued till midnight and John returned thanks for the only toast of the evening, "The President".

x' Joanna Baillie. 1762-1851, poetess.

But in a sense 1820 makes a semi-colon in the life of the Younger Herschel. Six years ago, his imprisoning Tripos work ended triumphantly. He burst forth, in joy out-rivalling a surf-rider, to rush through the thrill and swirl of intellectual life excited beyond measure, rejoicing in his strength and only panting out to Babbage: "Non omne possumus omnes". The waves of trouble breaking over his home-life partially diverted this course. He is spending more hours in social engagements though also working harder than ever. His sympathies are increased with the enlarged circle of his acquaintances and by the manifold demands made on his time. The advancing feebleness of his Father often made it incumbent on him to break off his own work and devote his energy to showing off the wonders of the sky to his Father's visitors. His Diary shows that his happy versatile nature never took these interruptions amiss. Some of these visitors were merely important through official position, e.g., the Governor of Bermuda (brought by a mutual friend). Some were distinguished foreigners, notably General Dumauriez who brought over from Turville Park, his long-ago colleague, Count Garat. They had both been Ministers during the French Revolution, Dumauriez being for Foreign Affairs and therefore responsible for the victory at Valmy[x1]. Garat, Minister for Justice and accordingly responsible in law for the execution of his King[x2].

There came also social friends who dined and climbed the ladders of the Great Telescope. Others such as Dr. Slavinsky, Observer at Vilna, stayed a couple of nights and required special attentions. For him, besides an inspection of the greatest telescope in the world, John Herschel showed "some optical

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x1 Yet, in the event, he fled from France, hunted and a traitor, to England and lies buried at Henley-on-Thames.

x2 Though Herschel, as we shall see from his Diary, states it otherwise, the dramatic account of the death sentence given by Carlyle also may be true. Garat wrote: "Verdict: Death within 24 hours. Garat, Minister of Justice has to go to the Temple with this stern message, he ejaculates repeatedly 'Quelle commission affreuse'." ('What a ghastly commission'). See pp. 432, 433 "Biographie Universelle" for later accounts.

experiments" and also took him over to Windsor Castle. Other of Herschel's movements (apart from intellectual pursuits) are very generally interesting, especially on the following dates[x1] extracted from his Diary of 1820. "15th Jan: Committee Astron. Soc. Anecdote. At Ambleside near which no flint occurs, the mode of striking a light by flint and steel was unknown and the people of the village went to the blacksmith to get their candles lighted in the morning by hammering soft iron[x'] Mr. Lowry astonished them by the use of flint and steel. Wollaston suggested that the spark from two flints is electric and not capable of inflaming combustibles. NB. To make the experiment.
12 Feb. Went to Mr. Gorton's to see Duke of Kent's Funeral Procession.
15 Feb. Went to see His Majesty lie in State at Windsor.

x1' Footnote.
"Before 1827, flint, steel & tinder box (were used) to light matches of cardboard dipped in brimstone." Recollections of Sussex Parson. E.B. Ellman. [Skeffington 1912.]

r[x2].
ment.
in which
r of whining.
the play. It
makes an old and venerable man both pitiable and contemptible. These wrecks of human nature should be kindly veiled from public view. Cordelia is a tender daughter but does nothing but look for her father on a windy night and grieve over his misery when found.... Returned with Greenwood and finished the evening over a bottle of champagne.
11 May Whispering Gallery of St.Paul's. Timed sound travelling.
23 May Eton Montem[x3]
26 May Went with Ryan[x4] to the House of Lords.
5 June Called on Wilkie ... he showed us progress of his picture for Duke of Wellington. He also showed me a little model with clay figures in a box from which he had painted the "Reading the Will".
June 13 Called at 19 Downing Street on Mr. William Strutt of Derby. Bishop of Carlisle called on me and we spent some time together in a thunderstorm.

x1 1820. Ap 21. Party at Mrs Baillie Cavendish Sq. Present: Sir Th. Lawrence, Mrs Siddons, Lady Byron, Dr & Mrs Somerville, Miss A & Miss J. Baillie, Lady Campbell Dr Roget etc. — Scott left room two minutes after I arrived so did not get to speak with him.

x' cp. Recollections of a Sussex Parson. E.B.Ellman.

x2 Datuc (biographie)

x3 See Autobiography of Lord Campbell Vol.1. p.373 for an account of this same Montem of 1820.

x4 Ryan Babbages brother in Law.

experiments" and also took him over to Windsor Castle. Other of Herschel's movements (apart from intellectual pursuits) are very generally interesting, especially on the following dates[x1] extracted from his Diary of 1820. "15th Jan: Committee Astron. Soc. Anecdote. At Ambleside near which no flint occurs, the mode of striking a light by flint and steel was unknown and the people of the village went to the blacksmith to get their candles lighted in the morning by hammering soft iron.[x2] Mr. Lowry astonished them by the use of flint and steel. Wollaston suggested that the spark from two flints is electric and not capable of inflaming combustibles. NB. To make the experiment.
12 Feb. Went to Mr. Gorton's to see Duke of Kent's Funeral procession.
15 Feb. Went to see His Majesty lie in State at Windsor.
2 Mar. Miss Deluc's evening party (Windsor)[x3].
2 Apr. Easter Sunday. Received the Sacrament.
10 May Went to play and saw Kean in Lear, in which he failed entirely, making it a mere affair of whining, ranting and affectation. I do not like the play. It makes an old and venerable man both pitiable and contemptible. These wrecks of human nature should be kindly veiled from public view. Cordelia is a tender daughter but does nothing but look for her father on a windy night and grieve over his misery when found.... Returned with Greenwood and finished the evening over a bottle of champagne.
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x' cp. Recollections of a Sussex Parson. E.B.Ellman.

x2 Deluc (Geographer)

p3 See Autobiography of Lord Campbell Vol.1. p.373 for an account of this same Montem of 1820.

x4 Ryan — Babbages brother in Law.

June 14. To Angerstein's collection.
June 26. (London) Took a boat up river by moonlight. Dreadfully hot. Thermometer in my lodging at 80° all day. In the rooms below it was at 89°[x1].
June 28. (Slough) Evening; went with Babbage and Mrs. B. to the Terrace at Windsor.
June 29. Rode in Windsor Forest in the evening with Babbage and Mrs. B. General Dumauriez, Count Garat and son Comte St.Martin called in the evening to see the Telescope and at 11 p.m. all except Dumauriez came again. I showed them the Moon etc. NB. Dumauriez is very infirm and nearly blind. Garat is the man "who" as Comte Martin said, "founded the Institut"; he is said in the Revolutionary Plutarch to have been the man who announced to Louis XVI his sentence of death and to have done it in the most unfeeling and brutal manner. He began by being editor of the 'Journal de Paris'. He was a great favourite of Buonaparte. He seemed much respected by the rest of the party and walked in the garden alone, retiring from the party, up and down the lawn. He said nothing remarkable but seemed very anxious to describe what he saw in the Moon, which he did not do very clearly. The rest of the party: ... Garat's and St.Martin's wives and a daughter of the former, a deformed girl, but uncommonly lively and amusing and inquisitive.
July 1. Took a boat up the Thames as far as Clewer Reach with Babbage.
July 14. Babbage breakfasted with me at the Hummums[p2]. Went down to Greenwich by water. Arrived at 12 with B. and Peacock. Visitation at Greenwich at 2. Pond recommended that means be taken to render the Library at Greenwich accessible to the astronomical public and print a Catalogue. Returned in evening ... in Admiralty Barge with Babbage, Peacock & William Smith M.P.for Norwich[p3].
July 22. Dined at Eton College. Election Saturday. Met a considerable party of pp: Hilton Agutter. Anecdotes. The toll at Colnbrook let for £2400 last year and only £70 less this year. 100 coaches per diem

x' See p On his Wedding Tour.

x1 On his Wedding Tour

p2 In Covent Garden, now removed to Jermyn Street.

p3 Smith was the M.P. into whose arms Spencer Perceval had collapsed when he was assassinated in H.of Commons in 1812.

pass that gate.

Captain Pechell (known to Mr. Grover[x1]) and has told him, long since, the anecdote of the Queen's (Caroline) conduct with Bergami in his ship; he says Pechell is a most respectable man and instantly sent a dispatch about it.[x2] July 24. Election Monday. Dines in Eton College Hall.

Aug.25. Visited Ashridge[x3] and saw interior of house, grounds, gardens etc.

Dec.7. Went to R.S. Met Parry.

Dec.8. Went with Mr. and Mrs. South on board the "Hecla" and "Snipe", Discovery ships from the N.W. Passage by an introduction from Capt. Parry to Lieut. ~~Palmer~~ Palmer.

Dec.9. Dined at Sir H. Davy with several other Members of the Council of R.S. ... Sir H. mentioned that Lord Byron had told him at Venice that he did not mean to publish any more of Don Juan, that its intention had been mistaken by the public, he having meant it as a moral tale!

Dec.28. Dined at Provost of Eton. Present: Mr. Joyce, his new curate of Hitcham, Mr. Champneys. Mrs. Goodall, a niece, and self.

Dec.29. Small musical party at Mr. Griesbach.[Windsor]

1821.

May 15. Date of my appointment as one of the 3 Resident Commissioners of Longitude in the room of Wollaston.

May 18. Attended sale of Sir Joshua Reynold's pictures (of the late Marchioness of Thomond's).

June 17 Went to Newgate to hear Mrs. Fry lecture the female prisoners. [x4] To last Meeting of R.S. Council

July 19 To the Coronation

July 21. Left London with Babbage for the Continent.

These extracts have given a sketch of the life he lived in the background of his work which warranted his many appointments, viz: Foreign Secretary to the Astronomical Society; Member of the Council of the R.S.; and his nomination as one of the three Commissioners for the Board of Longitude besides being on the earliest Committee for the new Observatory at Cambridge, a

x[1] Rev. Grover, incumbent of Upton-cum-Chalvey (now known as "Slough)"

x[2] See Trial of Queen Caroline.

x[3] Now Conservative College.

Foundation Member of the Cambridge University Philosophic Society and elected to the Geological Society. The Members of these bodies at once recognized the momentum supplied by his vigorous intellect, they came individually into contact with the driving power of his personality. When a demand came for an unbiassed and truthful expression of opinion his name rose spontaneously to their lips. They knew he would write, unrestrained by thoughts of currying favour in high quarters. He disdained the extravagantly spiteful opprobrium popular with the pamphleteer in the early 19th century and his vehement opinions, conveyed with suavity, persuaded his hearers.

Of all his contemporaries Charles Babbage knew him the best, yet like Grahame he constantly found himself baffled by the impenetrable smoke-screen of Herschel's habitual reserve, and yet a little of Babbage's lighthearted chaff might have saved poor Herschel from drifting into an engagement with a young lady. In the end, it took all Babbage's savoir faire and tact to extricate him, (the much agitated Lady Herschel having appealed to Babbage when the question of "Settlements" arose.) She wrote: "My dear son is so perfectly unacquainted with business of this kind that it will be more necessary for you to be so good as to see this business properly executed. I will thank you not to say a word to my son that you have heard from me ..."

To this Babbage made the helpless reply: "... as I have lately felt obliged to make some remarks to him which could not fail to be unpleasant, although his excellent heart immediately acquitted me of the least wish to hurt his feelings ... I should not think it desirable that I should urge him further on the subject till he opens it a little more to me. I must do my friend the justice to say that I believe his great reserve gives him as much pain as it does difficulty to me in talking with him about his affairs. ... I think you will allow that until your son has confided a little more of the circumstances to me, any interference of mine would not only appear extremely indelicate, but might frustrate the very object it would be intended to obtain ..."

However, between them, they proved to the miserable John that the affair could be terminated without loss

of self-respect on either side. This done, Babbage forthwith whisked John off abroad and in the ardour of friendship travelled with him across France, Switzerland and Northern Italy, Visits to foreign scientists from the two Secretaries of the Astronomical Society forming an easy excuse for their tour.

Keyed up to a high state of excitement for the adventures in prospect, Herschel and Babbage drove away from the Charing Cross stage-coach-office, where Peacock had arrived to keep them company to Paris. Late in the evening as they drove into the "Old Ship" yard at Brighton, Jones[x1] and Rose[x2] appeared and the young men made a jolly evening of it, "mirth was not wanting to season our repast;" Jones announced that he should cross also and put off till Dieppe the business of a passport for Rouen, because at Brighton "the French Consul is said to be always drunk or absent." Finally they expected to find D'Arblay[ß3] waiting in Paris to coach with them to Geneva. In fact all Herschel's friends rallied round him.

The master of the schooner "Independent" covenanted with them for a guinea a head to set them across. She took 32 hours with a head-wind and heavy seas. Even four stout Captains of merchantmen, their fellow-passengers, were prostrated. Then came a dead calm and everyone baited mackerel lines. The four philosophers amused themselves:"listlessly drawing the fish out and discussing vast and general theories the while. [NB. Mackerel do not die the moment they are out of the water"] writes Herschel.

After sundown they beat off-and-on Dieppe Harbour for five hours, the tide did not serve and no boatman turned out at midmight on a Sunday.

The whole of Monday morning passed dragging through the Customs and procuring passports to Paris, their London papers being only available to the port of entry.

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x1 Richard Jones later succeeded Malthus as prof. Political Economy King's Coll: Lond:

x2 H. J. Rose, Bell Scholar 14th Wrangler 1817 Trinity Coll: Later "Christian Advocate."

ß3 Alexander D'Arblay whose mother was née Fanny Burney. 1794-1837

"We had no reason to complain, our philosophical apparatus was allowed to pass duty-free on representing intention to proceed to Switzerland with views partly scientific."

The English and French Surveys now in the course of completion giving the reason for their enthusiasm to practice daily Barometrical Observations[x2]

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x1 "The said apparatus was fairly bulky, it included:
A Mountain barometer by Troughton very perfect and fitted with peculiar care by himself at Mr. South's request, the mercury being distilled for the purpose by the latter who kindly presented me with the instrument.
A small chest of Chemical Apparatus, etc. for the examination of Minerals, consisting of the Three stronger Acids, Alkalis and other necessary tests and reagents, platina crucibles, silver evaporating dish, porphyry and small wedgwood mortar test tubes, small matrasses, funnel, filtering paper, thermometer etc. etc.
A Tennant's blowpipe with the usual appendages.
A pocket Compass graduated into degrees, and worn about the neck like a locket.
A small pocket Sextant lent me by Troughton.
A good Thermometer by Troughton.
A large and small Mineralogical hammer and chisel.
A Reflecting Goniometer by Cary, Optician, Strand, London on Wollaston's construction.
A Camera Lucida, Drawing board and other apparatus for drawing.
With various other useful apparatus" and volumes.

x2 "This excursion afforded an opportunity of trying our Barometers: Our observations were as follows:
(1) Place of obs. Dieppe, the enclosed quadrangle called the Bourse or Exchange. Time: 1.15. Babbage's Obs: (not filled in). My Observ: Therm.
(2) Place of obs. Chateau d'Arques. In the inner Enclosure, exactly in front of and about 20 ft. from the most western on the 3 towers which form the principal mass of the building. Time: 2.40. Babbage's Obs:, (not filled in) My Observ: Attached Therm 67, Barom'. 29.535. NB.Babbage's Station about a foot higher than mine.
(3) Place of observation Hotel d'Angleterre Dieppe about 1 foot lower than the Bourse (Bourse 9 ft. above high water level. Time: 4.40 p.m. Babbage's Obsn. Thermr. --- Baromr. --- My Obsn: Thermr.68.8, Baromr. 29.796.

Note continued on next page.

Carlson 117 to 285.

In a red-leather backed notebook labelled "Tour in France 1821" Herschel kept a full account of the next three months. On first reaching France the entries are ingenuous, tending to the prosy. When he gets into his stride his eager amassing of facts, or impressions, characteristic of all his writings stands out notably and here we trace the formation of his decisive style.

"We took a voiture and visited the Chateau d'Arques (perhaps the noblest ancient monument of the kind France has to show) the character of the surrounding country strongly reminds one of a Devonshire scene. Our guide amused us much with his vile French "vous avons" and his stories.

"Tuesday, July 24th. This morning at 5 (Jones having got his passport to Rouen) we set off in a voiture (post-sociable or landau) and pair for Rouen (40 m.), the landlord assuring us that the same horses would take us the whole distance in 7½ hours with all our luggage. We had had some idea of going on to Paris by the Steam-boat, but it was as well we did not for it was burnt that very journey." He thoughtlessly mentioned this to his mother, and she immediately wrote in wild alarm: "Let me beg of you, my dear John, not to be too venturesome in your pursuits, for the number of accidents we hear of every day frighten me to death. Do not let one opportunity slip in writing to us for, in your absence, it is the only comfort we have, to read your letters (which always entertain us)."

At Tostes they baited the horses. "Whilst the eggs were boiling, Jones and I stalked into Church at the end of the morning service. Nothing could be stranger. The Priest, magnificently bedizened in a blue and gold robe, had his train supported by 6 or 8 little ragged boys, like beggar boys. The congregation ourselves included were 7, all of the poorest kind who seemed to pray devoutly. The Church, dirty and ill-kept -(the pavé up the aisle not to be distinguished either by cleanliness or the regularity of its construction from that of the high-road we had been travelling since 5 a.m.)

Note continued from preceding page.

These data reduced give the Altitude of the upper place of observation above the high water level (or applying all corrections) 245.1 ft. NB. The Bourse is about 8 or 10 ft. above the high water level of to-day (say 9 ft.)"

(This sort of observation continues daily throughout his journey and is tabulated minutely. M.F.H.)

After breakfast, Jones, Peacock and Herschel, leaving Babbage to catch them up in the 'voiture', walked on for 5 or 6 miles beyond the Chateau de Merly, which to their astonishment had been entirely undisturbed right through the Revolution. There the road left the land of rolling cornfields[x] and avenues of tall trees for the hillier country round Rouen, where extensive Cotton-mills are worked in all the neighbourhood. "In no part of England do I remember to have seen more external signs of manufacturing wealth. The entry to Rouen is very fine. At the beginning of an avenue of close tall strait trees, about a mile in length, is the Barrière. Here we were stopped and the postillion made to pay duty (5 sous) and take a regular written receipt for a little corn he carried in a bag for his horses. This is the Octroi, paid on all wine, corn, etc. brought into Towns, the Barrière-keeper stands armed with a long sharp iron ready to thrust into any suspected bundle. (There is a refinement of malice in this. The long skewer has at the end a small hole and if there is any meat, bread, etc. concealed in a bundle of straw, some of it sticks in this hole and is betrayed).

We put up at the Hotel de Vattel in Rouen. Jones proved a most excellent and amusing cicerone. The houses are almost all extremely old and built like those of London before the fire. Wooden beams alternating with plaister. Gable ends to the street, carved oaken timbers projecting in front and carrying us back 3 or 4 centuries. The Central Tower of the Cathedral is surmounted by a vile wooden spire of very great height and almost rotten.[x1] Add to which a dirty old wooden clock is placed just before the west window, the finest of all. This building suffered very little in the Revolution. Indeed, the reason of such tranquility was obvious; the inhabitants were all of a mind, Jacobins to a man and the Revolution met not the slightest opposition....

We walked up above the town to St.Catherine's Mount, very steep, composed almost entirely of flints with chalk among them, discerning below us the towers of the Cathedral, and the Church of St.Ouen, remarkable for the extraordinary lightness of its architecture, rising above a chaos of antiquated houses. Far off

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x[1] This spire was burnt down in the next year, 1815, and replaced by the openwork iron spire now to be seen.

x Arthur Young writing just before the Revolution (1788) said "estates were to be had at a gift of the metayers (farming tenants) so miserably poor that it is impossible for them to cultivate well."

the extensive vale watered by the Seine in its windings, may be traced among the hills to a vast distance both ways. Descending into the town we walked to the Church of St. Ouen, which surpasses in simplicity, grandeur and beauty any gothic church I have yet seen. The effect of the whole from the west-end is beyond description fine. The Choir is surrounded by a high rail of wrought iron which has the effect of lace or fillagree work of extreme delicacy... The exterior, if possible, surpasses in elegance its interior effects. The Tower rising from the centre of the Cross grows gradually more and more ornamented from below upwards. Four corner turrets or pinnacles rise to a considerable height and serve as buttresses and indeed as the only apparent support of the summit of the tower, which hovers upon beautifully turned arches of a delicacy almost amounting to fragility, so that the light passes through and under it in every direction.

We returned to dinner and finding ourselves very hungry, the dinner good and the Champagne perfect, finished the day more merrily than perhaps in strictness we should have done.[x]

Wed. July 25th, 1821. "This morning we departed for Paris in the diligence at 5½. About half-way the Vineyards begin to appear but this year the grapes are almost entirely destroyed owing to the bad season.[x] We arrived about 8 (averaging 5¼ miles per hour). NB. The small breed of Norman horses seem very inadequate to the exertion of dragging such a moving castle as a Rouen diligence, but they are very strong and are urged to exertion by a most unsparing application of a large whip, which the postillion manages with wonderful dexterity. It is about 6 foot long and its handle is 5 ft., yet with this he can reach every part (even of the horse he sits on) with unerring accuracy; his favours are for the most bestowed on the middle one of the 3 fore horses, the salutary terror of this keeps the horses to the right and left in equal activity. The shaft horse comes in for hard knocks over the nose with the butt end, which makes him run restive, but it is of no use, he is dragged on by the rest. Passed

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x It was the farewell spread for that "bon viveur", The Rev. Richard Jones.

x Owing to the frequent ravages of phylloxera the growing of vines in these districts is now forbidden by a law passed in 18 .

the celebrated Machine of Marli for supplying Paris with water. A huge, clumsy construction of wood about to be replaced by a steam-engine. We saw the boiler lying ready."

At 8 o'clock that evening the huge vehicle lumbered into Paris by the Route de Neuilly, passing through the unfinished triumphal arch[x] begun by Napoleon, through the Place de Louis XV, the Place Vendome, the Bd. Montmartre.... "The evening was fine, the Boulevard verdant and lively and the whole scene exhilarating. Engaged apartments for Babbage and Self at the Hotel de Tours, Rue Notre Dame des Victoires." Peacock took up his quarters at the same Hotel and soon joined up with the other young men, all elated at the sight of the gay and handsome equipages in the streets of Paris and determined to call on as many friends and do as much as possible in a week.

Next day on their way across Paris to look up Arago at the Observatory, they went round to Fortin's workshop near the Panthcon with a thermometer (already broken) in the Mountain Barometer. That well-known old man was not too clear-headed but he promised it "on Monday", and on Monday Herschel, true to type, fetched it in person[x*]

However, Arago was not at the Observatory. Walking on to M. Bouvard's they found the news of their arrival in Paris had got about and that Laplace wanted them to dine with him at Arceuil on Sunday, Bouvard insisted on their dining with him one evening, for he was keen to talk with Herschel after their recent correspondence on the Eclipse of the Sun. He himself had seen it from Fiume with a wonderful clock lent by the Austrians and was full of "the extreme discordance he had found in the best observations of the eclipse amounting to a difference of 30s in the longitude of the best determined places; also mentioned having observed the occultation of 7 of the

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x Arc de Triumphe, building from 1806-1836.

x* Any other man would have risked its delivery to his Hotel by a'garcon de place', but convinced that he could do it with more certainty himself Herschel slipped out from a Meeting of the Institut on that Monday, strode off to Fortin's, secured the parcel, dodged round with it to the Observatory, deposited it there, hurried back to the Meeting which still droned on, extracted Peacock and, with him, immediately returned breathless and successful to dine chez Biot at the Observatory. This operation is so characteristic of Herschel that it cannot be omitted.

Pleiades on the 24th inst. etc." Time was getting on and they reluctantly left him to call on Madame Biot, where they were again warmly received and engaged by her to a dinner on the Monday. An animated and discursive conversation arose about "the arrangement relative to the junction of the Triangles between Dover and Calais etc. in which Biot it seems will take no part but wishes next year to verify the measures of the pendulum in the South of France with Captain Kater. The polarization of light made a part of our conversation and Biot produced an instrument similar to mine with Tourmalines etc[x]"

At last they tore themselves away at dinner-time to discuss lighter matters at the Restaurant "Rucher de Cancalle", which the gourmet Jones had specially recommended by the gourmet Jones.

Friday was a full day, first across to Lafitte the Banker's and then to dine, followed by a long walk up beyond the Boulevard Montmartre to make a ceremonious and ineffectual call on Lady Davy (at that time living in Paris). Later Herschel, Peacock and Babbage fetched D'Arblay and all hurried off to the banks of the Seine and into the Institut. In the library they found, amongst the throng of philosophers, Bouvard, Arago and Laplace all standing about in their official dress of dark green coats, collars bordered with laurel leaves, silk embroidered waistcoats, swords, etc., Herschel seized the moment, being a Commissioner of Longitude, to disburden himself of an official message, acquainting these gentlemen with the Resolution of the Council of R.S. In the highly technical conversation which followed it became clear that France ~~merely proposed~~ to connect the two systems of Triangles of the Joint Trigonometrical Survey by observations at Dover, Calais, Boulogne, Dunkirk and Hastings, Laplace alone to meet Captain Colby and Kater, Biot being ordered elsewhere. Laplace hoped Colby would bring a theodolite, holding that a Repeating Circle could not be used with sufficient rapidity. He himself intended to take some "immense lenses of a peculiar construction, and reverberators[x3] which he proposed to use for the purpose of signalling" but,

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x[1] See Biot's letters.

x[2] See p. 152/153.

x[3] probably meaning "reflectors".

(obedient to instructions) only at twilight, for fear ships should mistake them for lighthouses. Beyond the Library, Herschel, with Peacock and D'Arblay, threaded his way into the Great Assembly Room and, glancing round the Chamber, he detected a file of soldiers with fixed bayonets curtained off behind the President, seated with his two Secretaries, loyally enough, beneath the bust of Louis XVIII. He noted other soldiers mingled among the crowd of spectators in the gallery above. Any meeting in Paris, even at the Institut, might be suspect in 1821. France still seethed in political machinations thriving after the murder of the Duc de Berry and strengthened only a few days ago at the report of the death of the "Prisoner of St. Helena"[x1] Government promptly remuzzled the press, whilst Royalists and Doctrinaires again verged on fisticuffs and swords. Probably partisans lurked in this scientific company.[x2] Herschel had entered the Continent at a critical moment.

At last they voted the proceedings very tedious and crept out to dine at Grignan's. Winding up at the Odéon to See "Phèdre", they reckoned French Tragedy an acquired taste, but "the farce was delightful, lively and spiritual, especially the female characters!" The magnificence of the theatre lit by a central gas-chandelier greatly impressed them, also the stage-box for Royalty flanked by statues and handsomely fitted up.

A wet Saturday morning followed. But, fortunately, Arago returned their call and the morning passed only too quickly for he wanted to discuss Polarization, the Junction of the Triangles, etc. and Dr. Pearson's iniquities. "He seemed extremely indignant at Pearson's reply to his notice on the double-imaged micrometer and roundly taxed him with direct falsehood (C'est un mensonge) in his account of what passed between them at the Observatory. Arago explained Fresnel's recently observed laws relative to the interference of polarized pencils."

They dined again at Grignan's which, pacé Jones, "is by far the most comfortable restaurant in Paris!" They then trooped off to try for another chat chez Biot. Biot was delighted and took them round to put up their names at the Philomathematical Society where they met

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x1 Napoleon died on May 6th 1821.

x2 E.g. see Biot p. 424.

and discussed meteoric stones with Dr. Milne-Edwards, Tenard and Dulong."

On Sunday morning they took a landau to Versailles. "Though immense it is not imposing and though superb not sublime ... we were regularly dragged through all the apartments." Their vastness proved fatal because Herschel played up to the guide. "He amused us with his French vanity which I endeavoured to excite to the utmost by the most extravagant praise I could muster French to express and in truth I believe he was pretty well dosed." The young men had forgotten their dinner engagement to Laplace miles off at Arcueil. This quizzing stole away the time. In spite of rattling their horses over the pavé from Versailles they found to their shame that the company was already seated waiting for them and that those specially-invited guests included such world-wide celebrities as Humbolt, Bouvard, Majendie, Fourvier, Decandolle and Berthollet. (They were indeed fortunate to meet Berthollet once again for in the following year he developed a carbuncle which caused his death.) In a descriptive letter to his Mother, Herschel mentions that "M.M. Laplace, Bouvard, Biot, & Baron Humboldt request to be particularly remembered to my Father. The latter has been of great use to me and is a most charming man."

After an unceasing roar of conversation and hours of animation conducted in the French language Herschel, nervously exhausted, could only jot down the Headings of what it was all about: e.g. The Board of Longitude; our approaching journey to Switzerland; The Function of Triangles; The Tides; double star orbits and Nebulae. However one important phrase did linger in his mind: "Laplace speaking of my Father's views said: 'Il me semble que les idées de M. votre père sont très philosophiques et très graies'."[x2] Also in spite of the uproar he "overheard Babbage in an odd blunder: Laplace spoke of Wodus (Woodhouse) as very distinguished for mathematics at Cambridge, which Babbage took to be 'vous deux'!" Driving home with Bouvard, at the City Gates the search by the Octroi took place as usual on entering a town.

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x1 See Life of Dalton do. do. Petit & Dulong.

x2 See Lady Lubbock's "Herschel Chronicle". The reference is to the Nebular Hypothesis.

Monday's events began early and continued late, indeed his mental activities were so many and so rapid that for almost a week Herschel only jots down in pencil the barest outline of his engagements.

"Hughes called me up and with Peacock, breakfasted with us. Humboldt called. To the Institut. Dined at Biot's.[x'] Conversation turned on Malthus.[x2] Biot's violence in Politics as an ultra.[x'] In evening cards were introduced and some played - Conversation with Biot on polarization. Pouillet came in evening and Slavinsky.[ø] Conversation with Madame Biot and Pouillet on French Tragedy."

Paris was excessively hot before they left but they had to get passports and necessary cash, besides taking D'Arblay to Tortoni's. ("He would be lost if he went alone and indeed we have had trouble enough to prevent him losing himself in Paris already.") Then with Mrs. and Mr. Bowditch,[%] known as "Ashantee" Bowditch, they went over Denon's Lithographic Works. Finally all dined with Bouvard and Laplace at the Observatory.

"Conversation turned on the Astronomical Society,[≠] The Tides, Saturn's Satellites." In the cool of a lovely evening they adjourned to Madame Arago's.

The last day in Paris became intensely sultry and yet they must trudge up and down the stuffy streets to settle accounts and go across to the Bureaux de Police for more wearisome formalities till the happy moment came for "Grignan's".

This farewell dinner including Peacock, Hughes and D'Arblay only broke up in time for Babbage and Herschel to climb into the Cabriolet of the Dijon night-diligence. At the last moment, the lethargic D'Arblay decided to throw in his luck with them and scrambled inside. The five horses trotted and galloped through the valleys all the hot and airless night,

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x' See page 120 footnote. ≠ ≈ p. 122

x2 p. 115

ø Had visited at Slough in 1820. Was a F.R.A.S.

% Thomas Edw. Bowditch d. 1824. look up date.

≠ State names of F.R.A.S.s present).

long avenues of tall trees drifted past them in shadowy blackness and at last dawn brought a halt for breakfast. Then, on to Troyes for dinner and a rest, followed by another nightmare drive through the darkness and morning light. The only breaks were to change horses, when they stretched their legs, took their beloved observations and snatched a little déjeuner. The coach plodded over the Côte D'Or and reached Dijon in the late afternoon. Here Herschel made a succinct note: "Good town. Tall spires etc. Warm bath and clean linen ante omnia. Then called on Vallot."

The next day (August 3rd) is typical of the great exertions Herschel would undertake when his interests were thoroughly aroused.

The night before, as the diligence, drawing towards Dijon slowly topped the Col above Suzon, Herschel spies out the highest spur of the Côte d'Or far away to his right (until recently a semaphore station) and promptly resolves to climb it with his new instruments. With characteristic enthusiasm he was off alone by 6 a.m. next morning, recorded an observation at the Gate of Dijon at 6.15 a.m. (temperature 69°.7 F.) and another at the top of his mountain (Mont d'Afrique) at 9.10 a.m. (temperature 83°. F.) ("NB" says Herschel, "The vin ordinaire of Dijon and its neighbourhood is delicious. They charge about 1 fr. a bottle.") Being misdirected he only returned to Dijon about 11½ after a broiling walk of over 3 leagues,[x2] exposed almost the whole time to an unclouded sky. "I immediately hastened to Vallot's whose dejeuner I fouud I had detained." Not to mention the long-suffering Babbage! Herschel was oblivious of time when pursuing an idea. Afterwards Vallot did his best for them. He showed off the handsome large rooms of the Dijon Académie of which Herschel was an Hon. Member, They looked into a church, (a rara avis in Dijon, for the sans culottes had left but three unruined). Then Herschel adds: "Babbage being fatigued I accompanied M. Vallot alone to the Observatory. In the Observatory is a 7 ft. reflector by my father, said to be the only one in France."

Back again in a temperature of 81.7 to M. Vallot's house to compare Barometers.

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x' President Dijon. Soc:

x2 about 8½ miles (each way) return journey, down-hill.

"I returned to the Hotel de la Cloche, and having dined, lay down being much fatigued. I was soon roused, with the intelligence that a Gentleman of the name of Charbonnier, wished to see me. I rose accordingly." A fresh expedition began. Herschel felt it incumbent on him to drive this gentleman with Babbage and D'Arblay, to the famous 'Chêne de L'Observe', where Cassini had made a land-mark for one of his Triangles.

"We set off with our Barometers and arrived just in time at the foot of the tree in a cornfield to take altitudes. Time 8.30 p.m. Temperature 72.5 F. (NB. D'Arblay would read Faubla on the way!) M. Charbonnier does not appear a very profound astronomer, but seemed abundantly nettled at M. Vallot's having been elected an Associate of the Astronomical Society and not himself."

August 5th. Sunday. Took the Barometer at the Gate of Dijon. Went to the Cathedral. This morning I resolved to give up the system of travelling in diligences.... I purchased a carriage like a landau, for 1,000 fr. (£40.) NB. This is by far the most convenient and expeditious mode of travelling on the Continent. You buy a carriage at the beginning of your journey and sell it at the end. The carriage I purchased was built in Vienna and was two years old, it was a very good and even handsome one. Being with 4 wheels and a pole with the front of leather it comes under the denomination of a "Timonière", and pays for 3 horses at 30 sous (1½ fr.) each per post, postillion not included. (Postillion 30 sous per post is enough unless delayed etc.) Joined Babbage and D'Arblay at our Hotel. The latter, who had so far accompanied us on our journey as to be in the same diligences and Inns and to eat and drink with us, was asked 'if he would like to join our party?' After hesitating a long while he neither declined nor accepted the offer in words, but at length carelessly or rather listlessly flung himself into the carriage and off we set,[x] on a dead flat road, with the Jura Chain seen at a great distance.

Auxonne is a fortified town where we arrived just in time to escape being shut out, or in. 9½ is said to

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x "I thought this rather ill-bred, but knowing his peculiarities I thought it best to laugh at it." JFWH.

be the closing hour. This way of bottling up all unhappy travellers who may happen to be caught in the planetary moment in a fortified place is very annoying and one should always make previous enquiries before proceeding post late in the evening, also the Postillions demand additional pay for themselves and horses when stopped out from the town they came from and forced to remain the night. (This day's journey - 12 leagues = 34 miles.) Ever since we left Paris the heat has been almost insupportable. It lightened much and vividly all the way to Dôle."

Next day they profitted by their private carriage. They pulled up on the wooded cliff above Poligny attracted by the geological formation of limestone strata separated by loose shaly layers.... These became as hard as flint and resisted the nitric acid tests which Herschel applied. Whilst the horses baited Babbage set up the Barometers and Herschel rambled up the road to take a 'Camera Lucida' sketch. They had hardly trotted on again for half a mile when they came on a man, flung from his trap, insensible at the side of the road. His companion begged for help. The party returned slowly with him in their carriage to a little inn, saw him to bed and sent for a surgeon, but after vainly awaiting his revival had to continue their own journey, pursued by grateful blessings from an old woman. At Champignole, the light beginning to fail, they called a halt.

On Tuesday it rained almost unceasingly with a temperature down to 61.5 F. From 6 a.m. to 8.45 they splashed over mountain defiles[x] shut in the carriage and envelopped in driving rain till, plodding on round Mont Cornue, where the road seems to overhang its precipitous walls, they snatched glimpses through rifts in the clouds of the tree-tops below them and of the beetling limestone crags above them.

Arrived at the summit of the Pass[x] the mist melted away. They pulled up and Herschel got out to sketch the plain of Morez, spread out below. Now the descent began at once swift steep and sudden: "My mother would have been frightened out of her senses. The road winds for 8 miles down the mountain and is (by barometrical measures taken on the spot by Babbage and self) a 2066 ft. descent. An English gentleman, whose carriage preceded ours, narrowly escaped over-turning by his drag

x Crossing the Jura
x' Faucille Pass.

breaking. But his servant had taken the precaution to tie the wheel with a cord. The lack of a parapet renders it formidable when one meets a driverless timber-cart full of long pine-trees or when one's splinter-bar gives way just at the edge."

Half-way down they stopped to picnic in the carriage, bought a bottle of wine and got a bit of cord to mend the splinter-bar. Soon afterwards a sudden corner revealed the whole panorama of the Lake of Geneva stretched at their feet. The postillion deplored the clouds. "C'est dommage". The whole chain of Mont Blanc should have completed the view. Here Babbage and Herschel made the usual barometrical observations; "Temperature 52 F., wind and misty cloud, walked down to Gex and next day drove in to Geneva. D'Arblay slept all the way." Thus they crossed the Faucille Pass persecuted by rain and cloud along the whole of the magnificent scenery in "the Jura Chain, so little celebrated by travellers" (for this very reason.)

"1821. Wed. August 8th. Marked the blue rushing of the Arrowy Rhône on entering the town (Geneva). The colour of the water is a decided sky-blue of considerable intensity. It is no optical illusion arising from reflexion of the sky-light etc. It is seen and even best seen, where the river runs between high buildings which cut off all extraneous light.

In cloudy weather when it rains hard and when the lake cannot be seen, Arago supposes (as he mentioned to me in Paris) that the lake is like some varieties of Fluor Spar, blue by reflected, and green by transmitted, light and that the green colour is seen when (by a violent agitation of the water) light arrives at the eye after passing through a large extent of it. This theory appears to me very absurd. I cannot but believe the blue colour to arrive from some substance existing either dissolved or suspended in very minute quantity in the water. The phenomenon of the fluor I have noticed, and it appears to me to depend on some principal of absorption at the surface, not yet investigated but well worthy of attention."

Look up work Clark Maxwell

Having ascertained that Geneva town-gate shut at 11 p.m., Herschel and Babbage immediately took a boat, Babbage being a great waterman. They landed about a mile from the town, Herschel bathed whilst their barometrical measurements were in progress and later they

x See letter Dec. 14, 1868 to Tyndall.

"discovered that the adit to the Lake from the town is abominable, all uncleanliness is there concentrated"! To return into the town they purposely passed the Junction of the Ance and the Rhône, to see the blue clear water of the Rhone running some way side by side into the clouded waters of the Ance. Presumably D'Arblay went Robed! "A philosophical Society" has been formed in Geneva. I was present at one of the Meetings. We had introductions to Pictet and most of the more remarkable residents in Geneva. I met Sismondi the Italian Historian now busily engaged with his History of France, and Huber[x2] whose researches on the Economy of Bees may be said to have opened to our view a new intellectual world. He is very old, quite blind, but takes a lively interest in everything going on about him. The expression of his countenance is the most benignant I ever saw. In spite of rain, have passed the time pleasantly enough. I went to the Reading Rooms and I have seen Mr. J. A. Dulac and executed all Miss Dulac's[x3] commissions. Her shawl and muslins are all safely arrived. Yesterday I dined at Dr. Marcet's[x5] at Malagny, 5 miles from Geneva on the Lake, where I met Lord Minto and his son, Sismondi and his lady who is a sister of Sir James Mackintosh, also Sir Samuel Romilly's son,[x6] the Marquis Para and another Italian nobleman who had taken rather too active a part in the Neapolitan revolution[x7] and are now obliged to be anywhere but in Naples."

? Colegny

In Geneva the English Colony turned out for a second time that same day to meet him at tea chez "the hospitable and polite Pictet", there were Mr. and Mrs. Fitton[x8] with whom he had breakfasted that morning.

x1 Three years previously Babbage wrote to Herschel on Oct.13th, 1818: "I have just heard that the 'Memoirs of the Analytical Society' are known and, of course, admired at Geneva. I was asked whether you and I are still alive!"
x2 Francois Huber 1750-1830 "Nouvelles Observations sur les Abeilles" 1796.
x3 See Diary 1820.
x4 "We have now been nearly a week at Geneva without getting more than a momentary glimpse of Mount Blanc." J.F.W.H. to W.H.
x5 Alex[r] Marcet 1770-1822. Naturalized Englishman in 1800. His wife a celebrated authoress.
x6 "Romilly" was at Grettan's with J.F.W.H. - William Romilly resided much in Geneva. (See Romilly-Edgeworth Letters by S.H.
x7 In 1821, Austria suppressed new constitution of Naples by secret Treaty with Ferd: IV of Naples & maintained absolute monarchy.
x8 Fitton 17?to 18?(Geologist).

Lord Minto and his boy from whom he had just parted out at Malagny, besides other local celebrities Sout, Gautier, Penn-Stellen and Marcet himself. The news of Queen Caroline's death, just announced, supplied a buzz of general conversation, whilst Herschel and the geologists discussed quartz crystals in a quieter corner.

"August 13th, Monday. This morning Nicollet called and again compared barometers, then Gautier who breakfasted with us did the same till leaving luggage and our carriage behind us at Geneva, Babbage and I set off in a hired landau, the 'voiturier' was a little, pert, sharp lad, son of the owner', for Chamouni[x'] (Fortunately D'Arblay took it into his head to walk round the Lake, we encouraged him and parted company and so got rid of him.)" Without this temperamental companion the excursion from Geneva presented no uncertainties.

Herschel's Diary goes on cheerfully: "At Contamines I took a Sketch (No.5) of the Hills to which the villagers very absurdly give the nickname of Point de Midi and Point de Neuf heures, their summits serving them for a dial. The boys have planted a swivel for the echo at the Aiguille des Tours. We fired a pistol here and two or three more a little farther on. Very striking, repeated once or twice, and dying away in a long roll among the mountains. All the mountain torrents are in their glory owing to long and violent rains, the Cascade d'Espinasses now came in sight, 4 or 500 ft. fall. Long before it reached the bottom, the water was divided into the finest dust and in the act of separating assumed the most beautiful feathery shapes and seemed to hang suspended in the air. The only similarity is the descent of sand thrown out from the car of a balloon. Time of descent of water 7 or 8 seconds. The rock behind is limestone and the strata are spherical shells of great convexity."

The first sight of the massif of M. Blanc opened out just before nightfall and(be it noted) in 1821 no hackneyed description forestalled this impressive scene. The moon rising slowly behind the mountain, a[illegible] The "still and solemn" silence of the misty valley. Far-off a cloud forming in a clear sky against the snow-capped peak of the Aiguille des Fonds.

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x' For a description of this same road see Diary of Frances, Lady Shelley, (1787-1817) – (in 1816)

Immediately above them the Glacier de Bionnassay suspended in frozen menace over the village of Sallanches where they meant to stay.

August 14th. "Next day we departed for Chamonix in a kind of cart called a "Char", long and narrow, without springs and very low, you get in at the side and the feet hang down. In this you are jumbled without mercy. I quitted hold of my barometer but a single instant ... and before I could resume my hold, a reel of the vehicle pitched it out and broke it." (This occurred as he jumped out to help hold upright the char at a 'mauvais pas'.) "I also found Nicollet's thermometer broken in its case, although carefully stuffed with cotton. We diverged a little from this rough water-course road to see the Fall of Chêde[x] and being early in the morning a fine rainbow was exhibited. The primary rainbow involved in the spray formed at least 3/5 of a circle. The secondary bow was very distinctly visible but I could not distinguish the rings within the primary, only the violet passed into a faint blush of red ... Caught a noble view of Mt.Blanc rising above..the Furca... To get my sketch of this cost much time and much broiling."

Then on again into the gorge of the Arve thundering on the left at viewless depths below, past a huge dark crag, almost precipitous and exposing the flat faces of the strata in their own direction. A picturesque ruin of a Castle stands at the entrance of this truly Alpine defile, which opens into the vale of Chamonix close to the broken ice of the Glacier des Buissons. Their guide refused to approach the seracks. He said it was extremely dangerous because avalanches constantly fell from them. "Silenced but not convinced, as we neither saw nor heard any" the young ignoramuses retired. "The ice of this Glacier is very blue... the reason of this blueness, or, (if blue be the natural colour of pure water) of the want of colour in our ordinary water is more than I can well divine.

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x This was at the Lake of Chêde, since wiped out by a great debacle of mud and stones in 1837. See Frances, Lady Shelley's Diary in 1816 for a good description.

"On each side of the Glacier is a confused ridge of Granite called Moraine... there is no worse climbing than over Mordine... it is like Satan's progress through Chaos, but the track crossed it. We reached Chamonix just in time to save a wetting to the skin. The Hotel d'Union at Chamonix is excellent and full of English. Met a party we had passed on the road riding on mules."

In his room late that night, dog-tired though he was, saturated with the beauty of these scenes he burst out with pen and ink to his Mother longing and hoping to describe that indescribable view of M.Blanc across the valley. "The sublimest spectacle which I believe exists in Nature.... The sky is at length cloudless, the full moon has just risen above the snowy summit of M. Blanc which overhangs the house we are in. Nothing can be conceived more beautiful than the mild light as it falls on the rounded dome and the numberless pinnacles shooting up in pyramidal groups round its base."

"August 15th. We set off with two guides Joseph Marie Coutet and his brother-in-law on mule-backs to the Croix de la Flegère. The ride up puts one not a little in mind of riding up the roof of a house. But mules climb like cats, and their riders have only to regard themselves as so much baggage. Arrived at the summit the clouds cleared and the whole of Mt.Blanc was exhibited opposite to us. To our left lay the Glaciers des Tours, and d'Argentières; immediately before us and below our level, the Mer de Glace and the little huts at Montenvert. To our right the Glaciers of Buissons and Taconay."

"August 16th. Next day Babbage took barometrical observations on the bridge at Chamonix, and then we set out with blankets and provisions for the Montenvers. There I set up Babbage's thermometer and while it was getting the temperature of the air I took angles with Troughton's small sextant. After dinner we scrambled down to the Mer de Glace. After sketching the Aiguelle de Dreu, we retired to the hut near the glacier and the owner gave us coffee, made up a bed of branches of the alpine rose, spread over it a shepherd's cloak and our blanket and lit a large wood fire about a yard from our feet. Not being able to sleep a wink myself, I resolved to cut the matter short, and took my hat and ice pole to set forth for a nocturnal ramble." From Herschel's naive description, we infer that he set off in the bravery of ignorance as though for a moonlight stroll up an English hill. Later, the Swiss guide missed him and he must have roused up Babbage, leaving him sleepless with foreboding till Herschel reappeared. Herschel's account continues:

"The moon was glowing beautifully over the glacier as I climbed the mountain above Montanvert, but after much clambering over broken masses of gneiss rocks and snow I found my course arrested by a range of rocks which I could neither climb nor get round, but I was amply repaid for my trouble. The whole extent of the glacier lay at my feet gleaming in a moonlight brighter than I ever beheld. The stars shone with a steady untwinkling light, and Jupiter and Saturn were distinguished from the rest by their superior light, position and proximity to each other. The deep and lonely silence was only broken at intervals by the roar of avalanches, and once a single sheep-bell. Far across the glacier, some solitary chamois hunter had made his lair and the fire he had kindled, gleamed like a bright red star. I resolved to descend, but the light had shifted so much in the interval, I could no longer recognize my land-marks and though I steered back my course by the stars I soon found I was not in the way I ascended, for it was clear that I had got into one of those 'couloirs' which serve as a channel for the continual descent of tumbling masses into the valleys, and every step was now accompanied with real peril as even the largest stones slid down on all sides. I made up my mind to climb up again,

reached a sort of nest formed by enormous blocks and decided to stop there and come down in the morning. The sight of the precipice down which it would have been easy to have fallen 1200 ft. or more, the vast vacuity of air in which my cradle seemed suspended and the solemn loneliness of the situation, produced a novel sensation, bordering on trepidation, I will confess, yet not without its enjoyments. However, I wrapped myself in my jerkin, placed my ice-pole where I could instantly lay my hand on it and went to sleep. I was waked by the cold. After half an hour's hard climbing reached the top; and descending in another direction towards the glacier, reached the bottom easily. It was then between 3 and 4 (a.m) o'clock. I found Babbage standing flea-bitten and uncomfortable at the door of the hut. He wondered where I had been! We turned in again and dozed away the time, till sunrise.

August 17th. When we set out for the Jardin we put screws into our shoes. They are steel teeth screwed into the sole and heel of the shoes. We walked to the foot of the Mont de Tacul. Some little difficulty is experienced by novices at the passage of "The Mauvais Pas" where one is obliged to creep round a projecting face of the gneiss rock upon a little ledge, formed by the scaling off of the gneiss laminæ, but with the aid of the poles with a spike of iron at the end (which one always carries on the mountains) it presents no difficulty. I found myself excessively fatigued by my night's excursion. I was glad to rest and got a little brandy at the foot of the Tacul. Then led by the guide left behind with me, I crossed the ice and began the ascent to ye Jardin. Two more difficult passages, then we overtook our companions, (also a butterfly-catcher with his gauze net, who had set out from Montenvert before us). After traversing several fields of snow we came in sight of what <u>should</u> be the Jardin, covered with snow. We stopped at the Couvercle under whose shelter we set up our barometer[x'] and dined. The weather was superb, but a slight haziness in the immediate amphitheatre of rocks threw them to a greater distance. On this amphitheatre remarkable fine groups of quartz crystals

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x' 8,008 ft. alt: of Le Couvercle.

are found, which are almost universally of the plagiedral variety, as indeed are the greater part of those in the mineralogical collection of Chamounix, (a remarkable fact, not noticed before to my knowledge). Collected chlorite, quartz &c. from the granite masses on the glacier, and found Galena and Molybdena among the moraine and then returned. Later on, as Babbage was lounging at the inn door a peasant passed with an enormous bag full of strawberries which he offered for sale. Babbage bought the whole for a franc. There were enough to sup us both, and breakfast us next morning, eating to excess. Our hostess to whom Babbage (with an honest pride) displayed his bargain, exclaimed: "Mon Dieu, tout cela pour un franc. C'est deux fois autant qu'on donne de l'avoine à nos chevaux". (NB. The butterfly-catcher had taken 20 butterflies and expected 3 sous a piece for them. He called it a tolerable day's work).

August 18th. Saturday. This day was occupied in devouring the rest of our strawberries, in resting after the fatigues of yesterday, in strolling to Coutet's house, and inspecting and cheapening his minerals (quartz crystals and lapis ollaris and some Molybdena). The heat was intolerable walking in this close and hollow valley through the barley fields of stunted growth, where millions of grasshoppers made the ears ring with their shrieking. Coutet's hut was a good specimen of a home of the Swiss peasant - a small wooden fir-building of one storey, with one room for himself and wife, and a small back room for a kitchen with an enormous wooden chimney-place encrusted some inches deep with the smoke, clumsy wooden furniture, one or two red earthenware porringers etc. Coutet is an ingenious fellow, turns ornaments from the lapis ollaris in the winter etc. The interior is very dirty, and swarming with small insects, which according to the owner's strenuous asservation "n'etoient pas des puces"! though bearing a most suspicious resemblance to that much calumniated race.

August 19th. This morning we once more visited the mineralogist as I wished to procure a stock of plagiedral crystals of quartz for optical examination. A very large proportion of the Mont Blanc crystals are plagiedral, and among 54 sent from the Glacier de

Buissons 40 were left handed and only 24 right. Babbage bought the head and horns of a chamois. The chamois is now becoming rare in the neighbourhood of Chamounix. Babbage also explored the debris of an old lead mine, and got a variety of Sulphate of Baryta with a pseudo-diagonal cleavage.

No one has yet ventured up Mont Blanc this season, partly deterred by the loss of a party who ascended last year, carried off their legs by an avalanche and swept into a crevasse on the ice. One of the guides, a man of gigantic strength and stature saved himself by striking his pole deep into the lower stratum of snow when he found the surface sliding under him. Coutet was dragged out black in the face and insensible. His account of his sensations was laconic and very characteristic: "Ma foi, j'ai dit à moi-même - c'est fini - je suis perdu - voilà tout." This tale amounted to a challenge to any young men. "Hearing from Coutet of a practicable access to the summit of M.Rosa, we engaged him to meet us at Brieg on the 2nd Sept. with his mule."[x1]

Now they had to turn back for Geneva and as they went they noticed the formation of a fog[x2] on the Arve under remarkable circumstances. "It formed only where the ripple on the stream was strong and not on the stagnant water, the evening was still and warm and I attributed the fog, not to evaporation from the river, but to condensation from the air, by the contact of water fresh from the glaciers and very cold." These idle speculations on their road can be recognized years later in Herschel's article on 'Meteorology'[x3].

" August 20th. Monday. "Finding our former young charioteer at St. Martin with his landau, we engaged him to take us to Geneva.

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x¹ "A Chamounix guide is paid 6 francs per day and his mule is paid for at the same rate. The traveller rides the mule. The guide walks.... Coutet is an excellent fellow, cautious and at the same time bold, understands the Geology & Minerology of the country and can turn his hand to anything."

x² Op.167. re "Phenomena observed on Glaciers" 1842. Geol. Society's Trans: (How large stones do not sink so quickly as small stones on the surface of the ice)

x³ Op.224. "Naval Officers' Scientific Manual" 1849.

" August 21st. Tuesday. At Geneva we procured some travelling necessaries, had our own carriage repaired, shook hands with D'Arblay (whom we found had arrived here again after making the tour of the lake, and his pilgrimage on foot to Ferney[x1]) and drove off for Turin via Chambery and over the Mont Cenis Pass. We soon drove into Savoy, the change of money now began to grow puzzling.[x2] How puzzling it was shall be left to a footnote.

" August 22nd. We left Chambery at 7 o'clock next day and reached Montmelian in time for déjeuner. It is of the taking of the Castle at this place that Sully gives so lively a description in his Memoirs when held out by Brandis for the Duke of Savoy against Henry the 4th (A.D.1600) and we resolved on this account to breakfast here and investigate it. Our host a 'çi-devant militaire' had some knowledge of the siege of the castle, and described the situation of batteries as on the opposite side of the Isère, near the bridge, which agrees with Sully's account. We ascended to the old castle, it is in complete ruins. It is founded on an excessively hard close-grained black limestone crag, of which the walls are built. Two high towers like watch towers (and used as our postillion told us formerly for that purpose) overlook it. The road winds round the foot of 3 limestone masses through a beautifully cultivated vale, there the vines, wild melon and Indian corn, have a singularly pretty, gay effect. Oxen are much employed here.

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x¹ Presumably to visit the Chateau of Voltaire.

x² "The reduction of the Savoy coin to the French reckoning of francs and sous is extremely puzzling. The small change in Savoy consists of 8 sous and pieces of 7½ differing only on minute inspection. To change a 5 franc piece 13 coins at least are required, 8 of 7½ sous and 5 of 8s., and to pay odd sous is impracticable. It is convenient however to remember that five of the one sort = 2 francs, and that 4 of the other = 1½ francs = 30 sous (the usual change per horse, per post) and 8 = 3 francs - average cost per stage 5½ frs. including my tips "pour graisser les roues." J.F.W.H.

" The road suddenly winds round the huge conical peak of Mont Sapin, and enters the defile of Aiguebelle. Here among the foothills of the Savoy Alps, commences a series of rock scenery of savage magnificence. The river Arc begins to brawl and foam in its course from its descent and, being loaded with the fine micaceous powder, has an appearance exactly like floss-silk when the water is agitated.

" Aiguebelle situated in the gorge of the pass seems an excellent station. A lover of geology, mineralogy, picturesque scenery, simple manners and rustic comfort, would be at no loss for employment or gratification. The strata of gneiss rock under which Aiguebelle stands are better marked than anywhere within my knowledge. the strata here are all formed of micaceous laminae contorted together in coils of double curvature. Blocks of it lie piled by the roadside, and the roads being mended with it, the fine penetrating dust, was intolerable. With the head of the carriage up we were suffocated - with it down, eyes, mouth and nostrils speedily became choked up with it. (NB. The thermometer in our carriage stood at 83'7.) The road to St. Jean de Maurien keeps by its faithful companion the river Arcque. The valley grows more contracted, the rocks rise perpendicularly, and the river is now grown furious, (three broken bridges testifying to its wrath). As it threatened rain among the mountains, we arranged the carriage accordingly, and to save time, dined in it before driving through St. Jean de Maurien. We now enter the country of black slate, and ascend perceptibly. Nothing can be more rude and savage than the whole scene. I alighted to draw the contortions of a slate rock (Mt. St. Julien) in which the strata were evidently curved round a nucleus, but I had hardly got my outline when a heavy storm came on, ... making all snug we tumbled into St. Michel. Immediately on leaving St. Michel the road ascends rapidly. The river descending alongside of it, is one continued cataract the whole way, tumbling with deafening noise and headlong force over huge rounded blocks of mica slate. The mica slate here is admirably characterized.[x']

x' "It lies about in vast detached fragments of a rhomboidal form so determinate that I have no hesitation in assigning it to an effort of crystallization. In one direction only does it admit of a cleavage into Slaty laminæ, parallel to one side of the rhomboid. The features of the strata are parallel to one other side, and a cross fracture, (equally well defined with the strata) to the third. It is a very striking phenomenon." J.W.H.

" Night began to fall as we neared Modane, lightning flashed among the snow-capped hills, the dismal roaring of the river in a profound gulley gave additional sublimity to the scene. At length the ruddy glare of large fires, from some iron foundries, caught our attention. At one of these, situated at the foot of a waterfall of considerable height we descended and threw a rocket which exploded before it reached the top of the fall. The scene was a strange one. The savage wildness of the place, the intermittent glare of the forges, now blazing, now sinking into darkness, the roaring of the fires and of the waterfall, the explosion of the rocket magnified by echoes like artillery, is impossible to forget. Having made 14 posts, or about 80 miles since 6.50 a.m. we were not sorry to reach Modane after 9 p.m. and find tolerably clean, though rude accommodation. One of the most untoward things-which can happen to a traveller who likes to pick up information at his Inn, is to find his attendant deaf and dumb, as happened to be at Modane!

" It was a brilliant morning. We left the Arcque rushing violently below, the road rising over a gypsum bed. Passed the Fort of Axillon (across the river on an inaccessible precipice, so placed as to enfilade the road for near two hundred yards,) 47 cannon could be brought to bear on this point of the road. The fortress has been 4 years in hand and how the Emperor of Austria[x²] could allow the King of Sardinia[x³] to build such a fortress here is to me incomprehensible." —

Before setting out on the actual ascent of M. Cenis, they slept at Lanz-le-bourg where they heard a voice from the past! A fine-looking old woman came to ask charity of them, announcing in strong accents that she was 108. She said in her youth she had ridden courier to an Italian Prince for 30 years, passing for a man, then when Napoleon's Army finally marched through the village they had burnt down her home, the Inn, and here she stood reduced to beggary and the picking up of sticks. In the year 1821 the ascent took a whole day by a zig-zag road up a steep, grassy hillside with

x' 1817-1821.

x² Francis II.

x³ ? Charles Emmanuel ?

tall crosses every ½ mile to mark it in winter snows. Herschel alighted and climbed the shortest way to the turfy summit, passing refuges for the road-men and here and there haymakers working at the long grass. Here he settled down to sketch the wide-spread view of snowy mountain-tops with his Camera Lucida, letting the carriage slowly wind its way up with Babbage inside it. Babbage soon set up the barometer and found they were 2200 ft. above their last reading. From the toll-keeper on the top they bought a couple of bottles of capital wine and "tasted some abominable aniseed water", paid 18 francs toll for their carriage and heard that this man was another relic of the Napoleonic Wars. He complained dismally of his present situation, said he was an old courier of Murat and begged them to take him into their service. Below the Col they passed the barracks and Lake of Mont Cenis, then the road descended rapidly, swinging round in short abrupt zig-zags, the part just traversed often immediately above one's head and the part to come perpendicularly below one's feet (the total barometrical fall by Babbage's barometer being 5200 ft.). It was and still remains a masterpiece of engineering, intended for the passage of artillery, and they trotted steadily down to Suze stopping only to change horses at Molaret. Had they but known, here, camped just above them in the barracks of Cenis, were Plana and the Commission[x'] of French, Austrian and Piedmontese Observers for the International Survey, managing a junction of two great chains of triangles[x²] through the high Alps. One coming from near Bordeaux to Mont Cenis and the other (along parallel 45°) to the Adriatic, operating by flashes from gunpowder signals with remarkable accuracy.[x²] At one place in the descent the road sweeps across a ravine, apparently so narrow that they thought a rocket would fly it, but one fired at 45° did not carry half-way. Then emerging through another gorge, flanked by a steep savage cliff, the valley of Susa suddenly opened below them, revealing Turin far-off set in the midst of the Lombard plain. This place being Molaret the postillion pulled up to bait the horses and the travellers dined. Babbage set up the instruments and Herschel got a first Italian impression with a lightning sketch from his Camera Lucida, whilst a small boy, probably watching this 'Inglese', was in luck that day. Herschel says: "I gave 5 sous to a beggar boy because he asked for <u>charitá</u>, had he said <u>charité</u> he would not have been so successful." After getting into particular good humour with Italy and the Italians by means of an excellent dinner at the Hotel de Poste (and then dutifully observing the barometer) they trotted on to St. Antonin.

"All now is Italian. The beautiful training of the vines among the trees and the shrines of the Virgin in old walls attracted our attention, she is always represented as a little painted doll. We were now almost in the dark, which gave us the pleasure of witnessing the gambols of multitudes of fire-flies. Very singular. Their light is only emitted when on the wing by fits and starts in momentary gleams. Thus their flight may be traced all across a field by the appearance of flashes emitted at irregular intervals. Could not catch any owing to this cause."

And so they came to St.Antonin, a miserable village where they arrived in the dark and supped off pears and unripe grapes and for their last night in the mountains slept on rustling shavings, surrounded by farmyard sounds and smells. That night of rough comfort preceded one of meretricious luxuries at Turin on comfortless pink silk beds, gilt, carved, and very hard. They also abruptly exchanged, on this the 24th August, mountain roads and mountain breezes for the hot, motionless air of the plain. Yet a legacy from the mountain-roads proved to be a compound fracture of the carriage-spring which for the last mile into Turin, ingeniously employed itself (as the hind-wheel whirled past it) in scraping through the spokes. Every spoke being nearly severed, an entirely new wheel became imperative. In this condition they lurched into Turin, all down on one side.

"Turin is one of the most regularly built towns in Europe, but unfinished. Visited the Observatory, a very indifferent place perched on the top of a huge building near the Royal Palace, instruments were all away in the Piedmont Alps, for the Trigonometrical Survey by Carlini and Plana (already mentioned). Called at Messrs Conti's to get a new tube fitted to my barometer in place of the makeshift one I set up in Genova.

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x' There were the very men Herschel anticipated finding at Turin. see p141

x² See Laplace's letters 1824 and '25.

"this they did much to my satisfaction; here procured also some thermometers. Walked about to see the town. Among the crowd, assembled opposite the castle to see a Punchinello, every third man at least was an Austrian soldier, more intent on the populace than on Punch. The Austrians fear an insurrection[x] and adopt the most severe measures. Twenty-nine men have just been tried for treason and found guilty, four of them were executed. 40,000 people have fled from Turin. Everybody is leaving that could get away.

"August 25th. We called on a soi-disant philosopher to compare our Barometers.[x1] We found him in a little area on the roof of his house... His character seems wild and fanciful. He talked of sending up balloons to find the temperature of the upper regions of the Atmosphere etc. NB. The temperature in Turin was insufferable, 85° F. in the coolest places, in spite of the thunder-storm all night.[x2][x3]

"August 26th. Sunday. Started after a long delay for want of a permit from the police office for post-horses to Milan, without which there is no leaving Turin. On quitting the Sardinian dominions in the dark, the first salutation was a Douanier, in night-cap, taking a bird's-eye-view of us from his balcony. Half a mile further two fierce fellows "officiers de la Dogana de S.M. le Roi de Sardaigne" demanded, "quelque-chose pour boire", adding in a kind of audible matter "autrement, Monsieur, on sera obligé....." A franc and a half, made them very civil. A hundred yards further on we passed a bridge of boats of which there are 4 or 5 in this day's journey, and were then seized on by the Austrian Douaniers who, though in their night shirts, looked very fierce at being called out of their beds, detained us a good while, talked about a search. One of them came up to the carriage with a speech about his duty in his mouth, and his hand with an inviting negligence hanging over the door of the carriage. My bribe was a piece of silver about the size of half-a-crown, whose value I did not know, but thought might be about 2 shillings (actually about 6d.) Thus I accidentally discovered the minimum price at which an Austrian Douanier will sell his conscience, for the fellow walked off grumbling. // Got to Milan in the dark."

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x1 In this Kingdom of Sardinia.

x2 Sig. Castellano, late officer in Engineers. A man in advance of his times.

x3 "In the evening people come out of their doors and cool themselves by thousands." J.F.W.H.

Four days later Herschel wrote to his father that Milan is a magnificent place in which the art of luxurious living seems brought to perfection. Also that the Cathedral is probably the most splendid piece of Gothic architecture existing.!

"August 27th. Monday." Visited the Cathedral or "Duomo" as it is called, built all of snow-white marble. We climbed the steeple and got a superb view of the distant chains of Alps. By some fatuity we omitted to see the Patron Saint, the great and good Charles Borromeo who lies embalmed in a glass coffin below the Church.. [NB. On travelling never leave anything unseen.]

Oriani, who we much wished to have seen, was unluckily absent from the Observatory. Stricken in years, and satiated with star-gazing he retires during the summer months and enjoys the country... Visited the Brera... Attended La Scala which ranks with the Opera houses of Naples and London in size. The principal female singer is Madame Belloc a Piedmontese who sang in 1820[x] in London under the softer name of Bellochi (said in England, to be an Englishwoman by birth, named Bullock). The men, Leblache, Donzelli, etc."

Next day degenerated into a wild-goose chase in a search for Configliacchi at Pavia. Sir Humphrey Davy had armed them with letters of introduction. They took a voiturier and for 20 miles they listened to the muffled tramp of their horses' hoofs trotting through the dust of a dead-flat road beside dead-straight canal, [illegible] broken by a short détour to inspect the Certosa of Pavia. There, feeling well rewarded by its magnificent interior decorations inlaid with gems and precious stones, they drove on. Straight into the annual Pig-fair of Pavia! It was in full uproar: "the whole street one continued scene of grunting, filth and confusion." Pushed through this turmoil in the wake of a cicerone to the University. Configliacchi had flown. "Gone to Como." Sightseeing took his place till dinner-time. "The University is all to pieces" except for the Collections in the Museum. "Saw the Collegio a huge deserted building, fine fresco paintings, the colours are wonderfully brilliant. Crossed a fine old oaken-covered-bridge to get some dinner. Our Inn was full, we dined wretchedly and were cheated (under the title of Signori Inglesi) in our bill. Remonstrance being useless I assumed a fierce countenance & swore by my

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x See Diary. May 16th 1820.

"whiskers we would not pay, on which our host merely remarked "Si Messieurs ne veuillent point absolument payer ce qu'on demande, il faut ôter quelque chose," & to my great surprise did accordingly make a considerable deduction, we paid the remainder and departed with low bows from this rogue of a landlord."

"Aug. 29th. Called at the Milan Observatory on the Abbé Cesareo. There is a "Transit" of Reichenbach, 6 Munich feet in focus, with a four-inch object glass, its usual observing power 75. Its distinctness perfect. It is mounted on two granite pillars. The tower in which the instruments are fixed is 90 ft. high and they are all in upper rooms. There is Ramsden's quadrant 6 feet radius, which, so Cesareo says, always gives a Star's place to the same second. A splendid 3 foot repeating circle by Reichenbach with a 3 inch object-glass, its four readings off never differ more than 2". It is exquisitely divided on silver, one circle turning within the other. The limb is illuminated by dispersed light reflected from a screen of paper, which is far preferable to our abominable plan of silvered reflectors. Here is also a good heliostat for optical experiments.

M. Cesareo was exceedingly attentive he even had a small theodolite of Reichenbach taken to pieces to show the mode of fitting the vertical axis at its collar. [illegible], As always, the visit had opened ceremoniously by comparing barometers in Cesareo's study.

Herschel noted in Milan "Granite railways in streets. Walker's plan." And elsewhere", two lines of flags in the midst of the pavé for the wheels to run smooth on, a carriage glides along without effort, without jolting and almost without noise[x]."

At twilight they drove away north and reached Como in the dark. A storm in all its fury immediately broke over the town, continuing the whole night with tremendous thunder flashes of lightning and torrents of rain so that next morning they got wet through down by the lake-side and had to relapse into the travellers' 'vade mecum'. In fact, to write letters and bring their diaries up to date.

August 31st, the Feast of S.Abundeo, dawned fine and awoke them early by the sound of chanting voices. "The effect was novel". The weather remaining bright they took boat for "the Sue across the Lake". Here they unearthed Configliacchi eager for a long chat. They

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x This system has remained until quite recently. M.F.H.

soon excused themselves meaning to spend their day on and around the Lake. "The water of this Lake is quite green, a colour fully as real and decided as the blue tint of the Lake of Geneva. It is very deep, in some places not less than 1000 ft. Its temperature at a considerable depth is 12° "Reaumur". Round the Lake are many "elegant country seats among which is the Queen's (Caroline of England) house, Villa d'Este, now to be sold". Rowing home to Como they admired the "middling-sized, rather neat town with a handsome Church adorned with a Dome", spreading out before them.

From Como to reach the Simplon the route lies across-country by Varese (and the distant Madonna del Monte) to Lago Maggiore through rocks of gneiss overlaid by chalk. The party drove [illegible] to Laveno in the one day. Next morning, being afloat by 7 o'clock in two boats, had themselves, the carriage and luggage transported (at a charge of 40 francs for the 9 miles of water) across the Lake to Baveno. They sailed past Isola San Giovanni through the Borromean Islands and setting a course under Isola Madre, tied up at Baveno. Intra and Palanza lay to the north and in that superb atmosphere Herschel says the view opened out up both arms of Maggiore and away, far-off, to Domo Dossola.

This journey back to Switzerland continues on the magnificent road over the Simplon amongst enormous rocks, perpendicular, shaded with weeping-birch, hazel and pine. "As far superior to the passage of M. Cenis as that is to the Pass over the Jura, or that to the most ordinary instances of road-making in Scotland or Wales, a road as smooth as a bowling-green and with so gentle an inclination that the ascent is made at a moderate trot." After a night at Brieg the carriage set them down at Visp in the Rhône Valley.

All these [illegible] in Italy & in Switzerland copied extracts from Ellen Herschel's Diary

At the Inn door Coutet with his mule appeared & the Monte Rosa adventure now begins. Since the week they engaged him at Chamonix & heard his tales of mountaineering Babbage & Herschel cherished a secret ambition to be the first Englishmen to scale some mountain peak. Coutet declared positively he knew a way up Monte Rosa. It was enough. Everything now centred round this expedition. At Milan they laid in rope and "proper boots with hooked irons to screw into the toes and long poles of 6 ft. pointed with iron". Thus armed with an axe to cut steps in the ice, they set forth, dressed otherwise in their ordinary double-breasted coat, white choker, felt hat and trousers! x

Coutet came on his mule from Chamonix via Martigny & Sierre to join them.

Next morning events began to move. After routine observations at 8.55 a.m. Babbage and Herschel mounted horses and the cavalcade set off for Zermatt for 20 miles along the mountainous packtrack of those days. Herschel told his mother it was a road "your nerves would have agreed very ill with". It took them through "magnificent savage scenery" in the Nikolaithal till they halted at the Curé's house in Nikolai. Here a camera lucida sketch, a hurried glance round the inside of Church, splendidly gilded", then on again past villages set in more and more savage scenery, the sun gradually setting. Pushing on in the darkness they found a night's lodging with the Curé at Zermatt.

Next morning reinforced by 4 extra guides

x See pencil sketch by Herschel.

with food & wine for 2 days the party set off on foot up over the Matterjoch and down to Breuil, fifteen miles, fatiguing and at places steeply dangerous. A halt near the top of the Pass to eat their bread & cheese by the side of a chain across the road [i.e. the frontier of the Kingdom of Sardinia, then over and down to Breuil. Herschel notes: Growing dark. Excessively fatigued with eleven hours hard walking. After supper, which turned into a carouse, had some difficulty to prevent all the Carbonari from being locked in with us. Slept sound on the hay." Breuil seems rather a long way round but that barn was probably the only night-shelter then available.

On Thursday Sep 6th 1821 at 6.40 a.m. the real ascent began. They climbed back again up the Matterjoch Pass, taking a sketch of Monte Rosa at about 9 a.m. then riding the mule for about a hour to the frontier-chain again, within 20 yards of the Cross on the top of the Pass. From this point their track probably differed considerably from the stereotyped route of the modern guide. Herschel said: "Now commenced the ascent of M.Rosa itself. After 3 hours hard walking, always mounting, knee-deep in snow, the most brilliant sun blazing over our head from a sky of deep indigo blue, we reached the ridge, looked over the precipice at least 9000 ft. down into the Valley of Zermatt.x1

The highest crest of the Mountain remained, it was tremendous, a sharp edge of snow along which a cat might have walked. Our 4 Zermatt guides refused to go further. I persuaded Babbage who was excessively fatigued not to go further. Coutet ran forward to reconnoitre. When he returned, his remonstrance joined (I will admit) to the sight of the precipice on both sides which might reasonably cause some trepidation, had their weight and I gave up the attempt at this place. However, not to be baffled Coutet and I set out together (he carrying my Barometer) and succeeded in reaching the summit at 1 p.m. after about three-quarters of an hour climbing up a steep slope of ice;" With pardonable pride he wrote of this to his Mother: "Thus, I had the pleasure of being the only Englishman and but the 2nd or 3rd individual who has ever set foot on the summit of this stupendous mountain.x2" The scene was inconceivable, "on one side the eye lost itself in tracing mountains on mountains, all snow-capped, and valleys running into one another; on the other a sea of white clouds covered the plains and only the highest snowy peaks of M.Blanc and the loftier Alps emerging like islands from among them."x3

Here, on the summit Herschel set up the Barometer and took his observations. "Traces of a white Capôn. Copin

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x1 Baedeker says: "The ascent of the north side is difficult and dangerous."

x2 Unfortunately on further investigation it appears that, misled by Coutet's ignorance of the district they had climbed the Breithorn of which the first ascent is duly attributed to Herschel in the records of the Alpine Society.

x3 See Herschel's Article "Sound" Encycl: Metrop: 1829 (Op 71)

"Dead and torpid bees and ephemoris on snow in descent. Descended and after long and fatiguing march, accompanied with some danger in ye steepest place, arrived at the Cross of M.Cervin. Here waited for mules. Sun setting. Waited till half an hour after sun set and then walked: (the mules having arrived but demanded 12 fr + 15 frs.) on foot (therefore by the light of the moon) down over the snow. Arrived at 11¼ at Zermatt. Gave Babbage some Madeira whey and got some eggs & milk. Faces all blisters from the reflexion of the sun on the snow". (Babbage suffered excruciating pain and lost all his skin.") x'

Slept off "the fatigue of the day which was excessive. Rose at eleven paid off our drunken and stupid guides" and under Coutet's protection scrambled up to the Cross of M. Servin, having replaced Barometers by geologists' hammers. Found Titanium and other exciting rocks and so down again by moonlight to Zermatt and the evening

x' Footnote.

James Stewart who accompanied as guide

[An adventure probably told by Herschel to a brother-in-law and probably not occurring in connection with the ascent of Monte Rosa (sic).]

In 1821, Sir John Herschel attempted to ascend Monte Rosa. He was making his way with some difficulty along the snowy waste, looking carefully to his footing when he heard his guide in advance, exclaim "Mein Gott!" On looking up he saw nothing but the dust of an avalanche, which had swept the guide down the awful slope. What did Herschel do? Did he try to descend the slope and rescue the guide? Not a bit of it; he took out his pocket compass and observed the bearings of three remarkable mountain peaks (I presume the Matterhorn was one of them) and very carefully recorded the observations in his notebook. What an unfeeling man, you will say, to select such a moment as that, making magnetic observations! The excuse, it may be said, was that single-handed it is not very probable that he could have saved the poor man engulphed in the snow. The magnetic observations having been duly recorded, Herschel set off straight for the nearest village, and offered large rewards to anybody who would lend a hand in rescuing the guide.

The offer was not required. Everybody turned out and, guided by the compass bearings alone, found the place where the avalanche had occurred which, without the compass bearings, would have been improbable (or more properly speaking impossible) and the guide was dug out uninjured after having been buried about two hours in the snow.

A short length of surfaced track

up a mule path contrived at the base of a perpendicular wall "like slaty limestone or flinty slate with marble veins". Much impressed by the roof built over the path to keep stones which fall from above, from passengers' heads", as they walk in the rain. Coutet regaled his employers with tales of the eccentric English Miladi (Comtesse de Milford or Wilford) who captivated by the beauty of certain huge rocks, which he pointed out, bought them and, there & then, walled them round and had her name cut into the rock! "Leuksbad itself is in an amphitheatre of rocky pinnacles (query sand-stone?) frequented for the baths. A large comfortless hotel x' but very good food and a pretty waiting maid, the only pretty face seen in the Vallais".

To while away the afternoon they "mounted a queer place in the perpendicular face of the rock. The ascent is by down-right hard perpendicular climbing right against the face of the cliff. In seven places, ladders are placed, in almost a vertical position, which overhung in such a way as to render the ascent not a little frightful." x² Arrived at the top, looked down right from the edge of the cliff to the bottom. Threw over several large stones (timed by watch) 580 to 780 ft. before they reached the ground. This cliff in some places overhangs as much as 15 degrees. Gritty quartose stone, query sandstone? Saw the rocks of the Ghemmi. Surely no-one could ever expect to find a Pass in them. They tower perpendicularly and the place where the road of the Ghemmi goes is only marked by one oblique dark rift where a buttress of the rock seems to project beyond the rest. ϕ'

Waterfalls whose upper parts were lost in the clouds poured down on all sides, but so high and distant that no sound was heard. To add to the grandeur of the effect a solemn stillness pervaded the whole. The air perfectly motionless. Not a vapour flitted from its place or changed its form, fog still hovered between the turretted summits. "It required but little imagination to conceive airy beings, spirits of the mountain holding conclave each on his rocky pinnacle..., Then to the right

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x' In the Visitors' Book Hirschel found: "June 25. Sheepshanks, Berne to Domodossola?

x² "Persons liable to dizziness should not attempt the ascent." Baedeker.

ϕ' Of the Ghemmi Pass a modern guide book says "There is a Pass for you, it cannot be done even by mule-back so narrow and steep is the path as it climbs the Gemmiwand."

"Dead and torpid bees and ephemeris on snow in descent. Descended and after long and fatiguing march, accompanied with some danger in ye steepest place, arrived at the Cross of M.Cervin. Here waited for mules. Sun setting. Waited till half an hour after sun set and then walked: (the mules having arrived but demanded 12 fr + 15 frs.) on foot (therefore by the light of the moon) down over the snow. Arrived at 11½ at Zermatt. Gave Babbage some Madeira whey and got some eggs & milk. Faces all blisters from the reflexion of the sun on the snow". (Babbage suffered excruciating pain and lost all his skin.") x'

Slept off "the fatigue of the day which was excessive. Rose at eleven paid off our drunken and stupid guides" x" and under Coutet's protection scrambled up to the Cross of M. Servin, having replaced Barometers by geologists' hammers. Found Titanium and other exciting rocks and so down again by moonlight, to Zermatt and the evening exposure of Barometers. Less than an hour and a half after the last Barometrical observation of Saturday night, Sunday morning, Sep.9th began in the curetage. Midnight - The Church bells crashed forth continuously until daylight "like a thousand coppersmiths at work on a boiler" outside the window. Rose after being half devoured by fleas which drove poor Coutet out of his bed to seek the straw with his mule: 'Ah! Coutet, c'est vous qui vous levez?' 'Oui, Monsieur, je vais donner de l'eau à mon mulet.'" It was only an excuse to sleep with his mule. Babbage all night was rubbing his face with brandy in silent agony. No sleep to be got. Rose, cooked an omelette in a filthy kitchen and departed with Coutet for Stalde x'" across a queer bridge to see the "remarkable earth columns. Débris of decomposed felspar, clay and small stones washed into columns. Took two sketches of them x'" "

At Visp he complains of cheating "by the owner of the horses" which they had ridden to Zermatt and back. But at last they could settle into their carriage and tool along down to Leuk. [Noting local customs in the "narrow, ugly uncivilized" Rhone Valley, he remarks: "NB. Never get linen washed in Switzerland, they use no soap."] The carriage went on empty to await them at Sierre whilst at Leuk they got out for a two-days' adventurous climbing on the Ghemmi Pass. Herschel, Babbage & Coutet, leaving the post-road, struck away for Leuksbad trudging about 5 miles

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x' ~~Indignant...~~

x" About 15 miles nearer Visp. See later p 51 of Diary Town

x'" See engraving reproduced by Sir C. Lyell on binding of his "Geology." of Herschel's Sketch

an opening in the clouds disclosed a glacier far below, conspicuous in a gleam of sunshine. "Such was about the picture impressed on my mind". — whereas the boisterous mind of Babbage, when appealed to "set him talking about the Hottentot Venus" [illegible] down the seven ladders and over the slippery rocks back to Leuksbad..

They immediately went to the Baths; "Found the Baths very comfortable and luxurious about 94 or 96', supplied by pipes rising in the middle, each with a dressing room. 15 sous per bath."

Before taking the bath the unsuspicious savant sunk a thermometer in the "source" and left it there. "When I returned the boys had pulled it up and broken or stolen it."

Their passage next day over the Ghemmi is not detailed, a few notes remain including a sprightly pen & ink sketch of crags upon crags through which is hewn a tortuous path where a triumphant philosopher in tail coat & trousers stands halfway up, leaning on his long alpenstock.

Dallying about with their Barometer and their geological hammers they only reached the Ghemmi Hut after 4 hours climb; and hurriedly descended another way to sleep at Sierre. An off-day is now spent in bringing themselves up to date. "Wrote up journals, threw out ballast" (meaning cherished bits of rock). Made copious extracts from the Meteorological publications of the Hospice de S.Bernard and of the Jardin Botanique de Genève," then (picking up the carriage once again) they trotted, to the rhythm of plodding horses' hoofs, down to Martigny. Here they parted with Coutet, he to continue south to Chamonix, they to take the north road. "Coutet, voulez-vous aller au diable!" - "Non, Monsieur, mais avec vous j'irai moitié chemin!" and so "Farewell". At Martigny the fifty-mile posting charges from Visp worked out per post at 4 frs. for horses and 1½ frs per driver. At Martigny they again ran into Lord Minto and politely compared barometers with him before embarking for Bex.

Being in their own carriage they made an early start for they clattered into Bex by noon although they had idled about in the Trient valley to scale the Pissevache Waterfall & see the view, incidentally dropping rocks from the top (30 to 40 beats falling). Next they fired a rocket from the bottom, which only reached ⅔ of the way up. Then, mingling science with sketching, Herschel got a boy to hold an umbrella over him and at intervals to collect snails.* The Trient Valley is only a mile and a half out of Martigny. On the

* For purposes connected with its spiral shell, whether right handed or left handed.

next stretch of road they bowled along at a clinking pace through the gate at St.Maurice into the Canton de Vaud ["The perpendicular rock on the left in horizontal strata forming an amphitheatre" round the pretty little village] - till with jingling harness and sweating horses the postilions drew up before the Hotel de l'Union at Bex. to be a footnote

Presently they sauntered up beyond a "beautiful wood of chestnuts like Greenwich (Park)" to an extensive view across the Lake of Geneva. A rainstorm soon drove them back to order a most excellent dinner at the Inn! Then a heavy snowfall covered all the mountain tops, completely altering the weather conditions next morning; Herschel carefully noted the result "Two strata of clouds, Mackerel (15,000 ft), like a fleece over all the lower Mountains. Descending thus 800 or 900 ft. below the snow. A level surface below. The reason obvious, cold air descending to its level of specific gravity but not of temperature".

Bex is celebrated for its salt mines worked since the 16th century. Herschel's notes on his visit to those Souterrains lasting 2 hours, are copious and enigmatic to strangers. They give an impression of long tunnels in the rock, staircases, reservoirs of saltish water, intermittent springs, whiffs of sulph: hyd: a great wheel pumping the water, draughts of air drawing the lamp-flame up the passages and all extending far inside the mountain. They came forth, loaded with specimens: ("which on trial proved to be anhydrite.") On the mountain-side they spotted a goat with four horns. This fact Herschel quickly added to his travellers' tales, and then sat down to an excellent meal before starting at twilight for 20 miles steady trotting down to Vevay. Reached "Trois Couronnes" in the dark, at 10.30 p.m.

Their day at Vevay began at 6 a.m. with a boat excursion back to Chillon. Sketched the fortress,* set up the barometer at 10.5 a.m. Returned to Vevay, paid off the boatman (7 frs.) and then with Babbage settled down in the carriage to reach Meudon at 6 p.m. on the first stage to Berne. Travelling laboriously to suit the voiturier whom they had engaged at Vevay, Herschel's comments (writing to his Mother whilst in the carriage) were: "It is a rather uninteresting road which we are obliged to perform very slowly as we go 60 miles with the same horses at a charge in toto 63 francs." (They were of course still in their own carriage.) At 6.5 a.m. set up the Bar: in his bedroom at Meudon, recorded it and t[illegible] plodded off to Payerne reaching it by 9.45 a.m. Set

* Now known as 'Castle'.

up the Barometer 20 ft. above the street, horses baited, and on again in half an hour to Morat by the lake. Here the road crosses into the Canton of Berne and a 5 league stage further brought them, whip cracking and harness jingling, into the paved streets of Berne, being about 2 o'clock on Sunday afternoon.

Three days passed in Berne busily enough with M. Fueter in his study, M. Trachsel at the Observatory and M. Schenk at his establishment. He heard of a recent tragedy, so typical of Switzerland, "P. Morat lost in glacier of Grindelwald a month ago, hat found 100 toises[x'] deep."

" Wed. Sep.19. "Berne a very expensive place. Left Berne after another fracture of barometer and got to Thun. A great concourse of travellers, sketching ladies etc. Good cheap Inn. Thence by sailing boat to Neuhaus, passing the Cave of the English saint St.Beat ("floated on his coat"). Cascade 600 or 800 ft. perpendicular drop from cave to foot of Limestone cliff. Dipped a thermometer into the Lake, proved to be 11.9 or 12° R.

" From Neuhaus took a char à banc (strong resemblance to a low hung Irish outside-car) through Unterseen "over the Aar" to make [illegible] head-quarters at Interlaken, "A town of ancient wooden houses set in the midst of rich apple, pear and walnut orchards on alluvial soil closely hemmed in by mountains". He noticed 3 things during the evening stroll to Lake of Brienz: Walnut tree 21 ft. girth. Drawing ladies, and Miss Douglas!

Herschel

Next night slept at Grindelwald after exploring over the Glacier and the shoulder of the Mettenberg. Returning by a détour of one night up the Lauterbrunnen Valley, Herschel and Babbage carried out meteorological observations on the Staubbach Fall[x2] [illegible] The barometrical records above and below occupied three solid hours. They fired a rocket up the Fall on the return journey after riding up past the Trachsel lavine[x] to the Schmadribach lead mines. "Desperate work for horses, just practicable."

+Avalanche.

Herschel wrote to his father "The Falls come out by our measurements at almost exactly 1000 ft."[x3]

On Sunday [illegible] rose at 6, got in another sketch of the Fall and rode off down to Interlaken showing a nice discernment for: "beautiful female peasantry. One a haymaker. One passed on the road, hair elegantly dressed", no doubt for Sunday.

"Walked over the bog to Boeningen. Struck up with a christening party and went per boat with them (dass kostet wenig) to Iseltwald and then on again to Giesbach. There a gay al fresco party with other natives (relatives of Lory, the Swiss engraver). Boated back to Iseltwald to Mittagessen with Christening party, "dined off huge slices of boiled ham. Smiled at a little beauty of ten years old "who rolled her large dark eyes and turned away with affected bashfulness from one's admiration". Returned to Boeningen in torrential rain. Night came on and soon could see neither the rowers, the boat, nor the lake. "Walked to Interlaken. As neither could see the other, turned ourselves into glowworms by sticking large pieces of strongly phosphorescent fragments of a rotten tree lying by the way, into the back of our hats. At Interlaken found Bakewell and his wife & Vincent and Craddock, whom we had met at Thun." Next day walked the 4 or 5 miles down to Neuhaus and on by water to Thun. Picked up their carriage again and posted back in it to Berne.

Two nights at Berne to enable them to visit "the establishment of M. Fellenberg[x] at Hofwyl about which so much has been written and said in England and which certainly deserves all its fame". At Berne (probably in the Rooms of the Helvetian Society[y]) Babbage compared his barometer with Trachsel's, and Schenk read aloud a written account of his establishment and instruments[x2]. Then Herschel wrote to James South whilst Babbage found out the Billiard tables.

Travelling from Berne to Paris took five days' steady collar work to a ceaseless rhythm of hoof-irons clattering over pavé or squelching in and out of mud, and the rumbling of carriage-wheels growling a continuous accompaniment. Dating from Paris, Herschel tells his father "we traversed France as expeditiously as the sluggishness of French postillions will allow" and hopes to be home in a week unless delayed by the sale of his carriage at Calais and the Trigonometrical operations now going on there between the French and English. It was as well that he added this saving clause, for after 3 days gathering up threads with old scientific friends in Paris the carriage started away at 5 a.m. only to break a wheel near Amiens. Thereafter a furious, stormy night they drove into Boulogne[x4] with a spring broken down (reminiscent of their entry to Milan). It was twilight. At once they enquired for Kater in charge of the English Surveying party." Found them all out at Blennay Telegraph Station, Kater, Arago, Gardiner and Colby taking down their shed and preparing to leave their first station". Across the sea: "Fairlight Signal[x5] still burning very bright, beautifully defined in

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x2. See Herschel's Article on the "Staubbach" Edin: Phil: Journal 1821.

x' [illegible] one toise = one fathom = 6 ft. Probably meaning 600 ft. further along the course of glacier. Smith

x3 Modern Guide-books give 980 ft.

x' Fellenberg 1771–1844 "agriculturalist" see p 177

x2 Herschel made an Hon. Member Helvetian Soc: Nat: Scrutatorum" 1822.

x2 sup p 166 [illegible] y3

x5 A hill above Hastings Kent.

"a telescope. They have had dreadful weather for a fortnight. Arago has not had his clothes off, Season too late, possibly delayed by Sir H. Davy. In fact as usual it was no-one's fault, It was thought of too late, Cassini came to Calais, could not see Dover so went and spent 9 weeks in London! Returned, got a hasty glimpse of "Dover Castle en bloc, not the flagstaff." Then: General Kay's work was bad, The terrain almost impossible, said Kater, [illegible] and so [illegible] their talk drifted away into anecdotes about tigers and lions encountered on previous surveys, particularly Arago's lion between Tunis and Algiers.

Next evening Herschel promptly wrote to his Mother: "we had a pretty good passage from Calais[x] and if it had not been for the steam-vessel (which she had implored him not to take) we could not have made the passage, the wind being unfavourable and the other packets blown off." This, his first adventure in a steam-ship he timed carefully: "10.12 from pier, 10.18½ from mouth of harbour. Wet but not much wind. Two other packets left far behind, [illegible]. Arrived at 3.40. Five carriages on vessel. Mrs. Kater waiting on beach." Left Dover at noon, reaching London in the darkness of 10 o'clock.

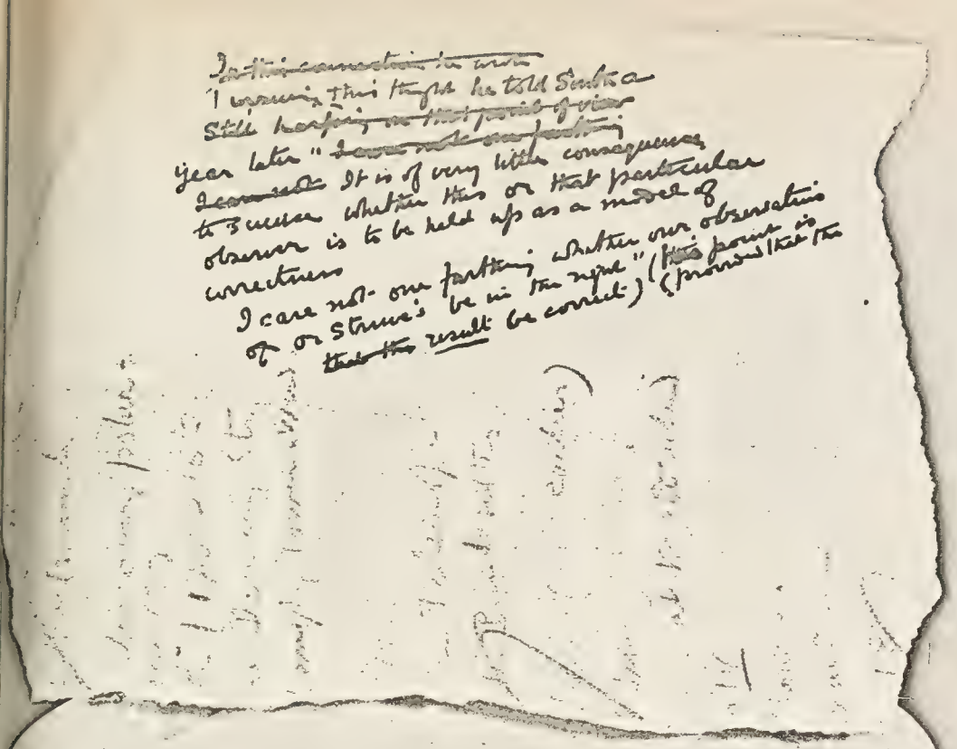
On Wednesday in duty bound he took the earliest opportunity to wait on Sir H. Davy in Grosvenor Square, but the President "is at Lord Darnley's, Cobham Hall,[x2] expected in town on Saturday".

And so released from official obligations Herschel took the next coach with alacrity for Slough, and home, and Mother.

Nov 1821. Peacock put up Herschel's name for United Union Club.-
Nov 1823. Herschell resigns membership

x1 see p167 later at 71
x2 In Kent between Gravesend & Rochester a magnificent building.

~~Partial connection in mind~~
I mean: This thought he told Sankara
~~Still keeping to that point of view~~
year later "~~I have made confusion~~
I remark It is of very little consequence
to mention whether this or that particular
observer is to be held up as a model of
correctness
I care not one farthing whether our observation
of or Sirius's be in the right" (~~His point is~~
~~that the result be correct~~) (Means that the



anticipate. to go before so as
{to preclude another
{hinder
{beforehand} or to shut out

generation
an age
or people of the same period
seems to have gone before the people of
(this their generation) the same period
in which he lived

Seems to have gone before his & his contemporaries
by foretasting the standard of a
future date

Next Chapter

The brilliant sunshine and enlivening altitudes of the Continent suited Herschel and charged his dynamos with fresh energy. Yet within a month the air of Slough and "the dust, the smoke, the closeness and the stench of London" threatened his health again. He tells Babbage: "I have got the rudiments of a confounded rheumatic fever or some such devilment, the greater part of the day I passed in a state of stupefaction in bed ... yesterday I hardly knew my limbs belonged to me." However he recovered rapidly enough to carry out a pleasurable duty, as Foreign Secretary of the Astronomical Society to notify to his now personal friends at Paris, Laplace & Arago their election as Foreign Associates. Already before he left England his writings on Optics and Papers on Light published in Phil. Trans. and elsewhere had attracted much attention amongst his elders as witness Brinkley, dating from Dublin Observatory in Jan. 1821 who wrote to him; "You whose progress in the improvement of Science, of Mathematical Science especially, I have watched with great interest." Sir H. Davy had long ago reconsidered his opinion with regard to the younger Herschel who had after all voted for Sir Humphrey to show his contempt for the anonymous and scurrilous attack made on him.

In his first Address at the Royal Society in 1820 Sir Humphrey directed public attention to the abilities of the younger Herschel linking his name with the giants of that date (Arago, Biot, and Brewster) for the originality and breadth of his reflections. In November 1821 the Royal Society awarded their Copley Medal. They singled out Herschel for this distinction basing his claim on his powers of mathematical constructiveness also on his original investigation and reasoning upon "The Causes of Tints developed by Polarized Light". When Sir H. Davy presented this Gold Medal he also drew particular notice to an intensely practical Paper by Herschel. It substituted a simple table of rules for their 'trial and error' method hitherto employed by English manufacturing opticians in the treatment of glass. Sir Humphrey's florid peroration winds up with a passage showing distinctly the younger Herschel's outstanding reputation even at this date: "You are in the prime of life, in the beginning of your career and you have powers and acquirements capable of illustrating

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[1] See Op.31. Supplement of Appendix to "Lacroix".

[2] See above, p.97.

[3] For a second time. See back p.

[4] Op.32. "Refraction of coloured rays etc."

[5] Op.33. Aberrations of Compound Lenses etc.

and extending every branch of physical inquiry. May you continue to devote yourself to philosophical pursuits and to exalt your reputation already so high: Virtutem extendere factis."

His foreign tour introduced into Herschel's "holy of holies" an adventurous outlook on the world. Gradually it coloured all his thoughts. He tried to knot up the torn threads of scientific work abandoned in the summer, yet by December he is, (as we can detect) sketching this new view-point in a letter to Babbage à propos to the vacant Chair at Cambridge. Babbage began to canvas Herschel at the instigation of Peacock arguing that "the cause of the 'd's' in which we have so long fought should not be delivered over to their enemies. Who can say (if Turton is Lucasian Professor) whether they shall not be expelled from Smith's Prize at least? If you have it ... I foresee a great improvement in our Cambridge studies. Do think a good deal before you decide on this point, as Turton is a young man." Peacock in his enthusiasm for Herschel had again been strumming the old chords, i.e., Herschel's name and connections. "[illegible]"

Herschel replies to Babbage:

J.F.W.H. to Babbage 2 Dec. 1821.

I have once more to thank you for an instance of active friendship in giving me the earliest intelligence of Vince's death and for your warmly expressed wishes respecting myself. It would, I allow, be a spectacle edifying to the world to see our triumvirate in a state of amiable contention for a Professorship of Mathematics, like 3 puppy-dogs pulling at a bone and perhaps old Towser popping out from behind a corner and running away with it ... I almost grieve that I cannot make one in a trio which promises so much amusement to both parties and to the lookers-on. You are not a man to be satisfied without reasons so I shall tell you mine seriatim ... I have already twice offered myself as a Candidate for a Cambridge Professorship ... and can you recommend me to woo for the third time the favour of these coy Seniors? It is in vain to say that I now stand on different grounds and have perhaps stronger claims than heretofore. It is possible I may, but I may fairly calculate on the permanence of their ignorance and must ever shrink from any endeavour on the part of friends to explain my pretensions or point out my merits (such as they are) to them. But I don't want you to suppose that I have no

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See above, p.83.

The friends: (1) Herschel, (2) Peacock, (3) Babbage.

better reason for declining to offer than being annoyed at a former want of success. There are much more rational ones. My own views of life and tastes for the good things it affords are very materially altered within no long period of time. I have no longer the keen relish for abstract mathematical studies I once felt, and, except excited to their application by something which interests me more, am perfectly content to relinquish the distant fame and equivocal enjoyment they offer, to others. I may say the same of the decision of the question between the "Ancients" and "Moderns" I am quite satisfied to leave it to combatants with more stomach to the fight, and contented with knowing that if the "Moderns" can't silence the "Ancients" they are sure to outlive them and that in the final adjustment of all things, this too will come right. But as it is very possible to be a Lucasian Professor without knowing or caring a half-penny about Mathematics, I must add too that a regular general residence at Cambridge and a course of Mathematical Lectures, etc. would be in the highest degree irksome to me. I shall always remember Cambridge with pleasure on account of the friendships I have found there, but if I once mistook the nature of this <u>feeling</u> so far as to suppose I could contentedly pitch my tent there, be assured I am no longer under the influence of any such illusion. A larger world and a more varied scene are necessary for my happiness and as far as mere Science is concerned I had rather pass my days among those who are advancing eagerly and rapidly and running a race with ardour, than in goading uphill the sluggish paces of any established institution under the sun..... I would not hold such language if I thought <u>you</u> had the chance of a chance. <u>Peacock</u> may succeed, he is well-known at Cambridge, generally beloved and esteemed and is I presume personally known to many of the Heads. I heartily wish he may and, at all events, I shall look on Turton's success as a real mischief."

In short, Herschel's own views are advanced and called "Modern", whilst the Electors (chiefly Heads of Colleges) hold conservative views called "Ancient" and that ends the matter. Next day Peacock implored him to stand: "It has been arranged", said Peacock, "for more than two years that Turton[x] should .. (get the next plum) .. I wish to God that you would even now become a Candidate for you and you alone would get several votes and at all events put them to shame for thus pre-determining the

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[x] Senior Wrangler 1805.

election before they knew who the Candidates would be. And you, my dear Herschel, are the only member of the University, who is worthy to succeed to the Chair of Newton."

Even in the face of this opportunity for a tilt at a gross example of jobbery Herschel did not budge. In fact his testimonial for [illegible] Fallows to the Cape Observatory and the sound advice Herschel tendered for the equipment and management of that new venture reveal the earliest simmering of his enthusiasm for combining adventure and new knowledge. It continued to simmer for 12 long years till it foamed over in his Cape expedition.

For the present however his attention still centres round the Laws governing light-rays, not only as already mentioned tracing them by theory in his Paper: "Absorption of Light by Coloured Media" but reducing them to use by an earlier Paper "Practical Rules for the Determination of the Radii of the surface of an Achromatic Object Glass."

He soon found in connection with this train of thought that the quality of the astronomer's own eye was an essential component where observing was concerned. His comments to Littrow on this link in the chain at once raised a lively correspondence:

Herschel to Littrow. June 25, 1822.

> ".... the sensibility of the Retina is so essential an element of perfect vision that when I examine a very unique double star, I keep my eye directed to another part of the field to bring the image on an unfatigued part of the Retina. By this means I am enabled to see and to measure objects which are absolutely invisible when the optic axis is directed full upon them and which disappear as if blotted out the moment they are looked at.

Littrow, thoroughly roused, replied from Vienna in the return post-bag:

> J. J. von Littrow (1781-1841) to Herschel Aug: 22, 1822
> "Have you any intention of visiting Vienna, your letter almost gives that impression? I should be hugely happy if you had, for - why should I conceal it from you - I have fallen in love with you. Your letters are so lively, I almost seem to hear you speak ..... We poor Germans are rather behind your

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follow-countrymen in mechanical skill, but we are getting pretty good in optics. I liked very much, your remark about the irritability of the retina and that you turn the eye sideways in order to be able to bring the image of the star on to a part of the retina which is not yet fatigued. So did everyone else to whom I told it. You see, this is one of those practical and priceless observations of which we have far too few."

However in another letter Littrow has some shrewd comments on the different results obtained by English instruments. He asks Herschel:

"Has Pond yet found an explanation for the difference of the polar distance which he has given with his excellent Circle of Troughton and those which Bessel has given from Bradley's Observations?"

Herschel's answer is an eye-opener into vistas of habitual happy-go-lucky methods at the Royal Observatory of Greenwich.[x]

"The mischief" he replied "originated in 1819 through the accidental loosening or displacement of certain screws connecting the Telescope with the Limb, in consequence no dependence is to be placed on the observations of the Instruments, in fact the Nautical Almanac for 1924 is rendered useless"!!

No doubt in his official position on the Board of Longitude Herschel's enquiring mind examined into this strange lack of accuracy for he is also able to say that this mischief he corrected so. "the anomolies have disappeared".

Littrow started an Astronomical Periodical, but complete disorganization in international transport existed on the continent following the Napoleonic uproar. He began a gossiping correspondence with Herschel on that very point. "I do not know whether you in England receive Scientific news from the continent with as much difficulty as we receive those from you. For us, England is as it were at the end of the World and your new books and your discoveries only reach us some years later."

It is hardly possible to exaggerate the petty worries endured by writers of letters or M.S.S. in the early part of the 19th century through unpunctuality, high tariff, loss by carelessness, theft, shipwreck and minor accidents of the road. Some letter-fees could be evaded by favours amongst friends. For instance letters from Slough directed to relations in Hanover used to be "franked" for them by some privileged person at Windsor who signed them up as far as the London Office of the Agent for the Kingdom of Hanover, here Mr. Goltermann (the Agent) enclosed them as a favour in the "King's Packet" and they went free across the sea to Hanover. Caroline Herschel mentioned also that of course if she happened to be in London on a post-day she just handed them to the servant of the Agent "because the Gentlemen are too much engaged on post-days and can seldom see anyone."

Postal charges were enormous. Herschel at about this time enlists his friend, Babbage-the-pugnacious, to trace to its source an outrageous charge on a small package "carriage forward" to Herschel (evidently refused by him). Babbage tackled Mr. Cox the broker and Messrs Coutts the bankers, and tracked it back to Vienna as a parcel of books with land-carriage charges of £2. 14. 0.!! Delambre, Secretary of the institut de France mentioned how his Society nearly failed to receive the First Volume of Memoirs sent by Herschel for the Astronomical Society. Delambre had refused to pay the preposterous postal charge of 1400 frs. (£56). However he found that (like hotel bills), this might be reduced by the expostulations and strong representations which Herschel immediately wrote to Viscount de Marcellas at the French Embassy.

Writing at this time to Herschel, Bodé complained that there is no regular communication between London and Berlin. As for correspondence with Bessel, the delay is phenomenal. Posted by Bessel from Königsberg on July 27th 1820, Herschel never received it until July 17th in the following year, yet their ardour remained uncooled in spite of this drain on their patience and energy, not to speak of the limited span of man's life. The point of exasperation arrived when none of Struve's Observations reached Herschel from Dorpat. "There is nothing" he cries, "more vexatious than this perpetual miscarriage of communications between England and the Continent."

It was the same within the Realm, vide a reply from Herschel. Brewster had requested him to send to Longman's of Paternoster Row any packets to be kindly forwarded with their "travellers". Losses arose and Longman stopped it. Herschel accordingly tells Brewster "As the transport of occasional packets is attended with considerable expense, perhaps you will give me the address of some other agent in London." For a consideration, coach-drivers casually accepted packets of letters to deliver on their road. Herschel refers with resignation to "a parcel of letters forwarded to me from Slough to Kensington last week which

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[x] A remark by Peacock to Herschel fits in here. "I dined with Pond at Greenwich on Sunday, the story of the baking of the Chronometers is literally true." What could have occurred?!

the Windsor coachman facetiously dropped out of his pocket and which has never since been heard of."

For another sixty years these pinpricks to any eager mind continued to prick, quite unabated by the Postmaster-General. We may say that parcels were a regular source of vexation to Herschel and many another until the establishment of the Parcel Post in about 1883. Up to that moment travellers and any visitor to a country-house, were solicited to kindly take and deliver some parcel "since you are going in that direction".

Other interrupting little pinpricks came from Autograph hunters, even Count Orloff not being above killing two birds with one stone. He writes to John Herschel (relying on a gossamer thread of acquaintance) about his "old friend" Sir William Herschel and asking for some lines of his writing. "Only a few lines written by the great Herschell (sic) will do me happy and particularly given by his son."

Practical astronomy is amongst the torn threads to be ~~resumed~~ by John Herschel. Before the foreign tour his 20-ft. reflector forced itself on his attention by actually falling to pieces under his hands. Hence arose a personal interest in the skill of English instrument-makers. The excellence of the Reichenbach instruments abroad impressed him, he conveyed to Bessel the view that the English standard fell short of the Reichenbach level, similarly Guinand's[x] flint-glass seemed to him a substance apart. When attracted by a very perfect repeating chronometer made by Schenk of Berne[x] and brought to England by Lord Minto, Herschel had half a mind with his help to install this Swiss instrument-maker in England. He assumed that someone would have to find £600 to transport Schenk's family and tools. By judicious enquiry in Berne, he concluded that though a wonderful workman, Schenk was no business man, besides which he found a strong prejudice in England against foreign artists. This trade attitude saddened him and he wrote characteristically: "Its existence has given me great pain." But the subject had to sink into the limbo of lost causes.

Doubtless conversations abroad jogged his elbow about the practical side of mathematics. On the Continent, from Cassini and Arago downwards, he had encountered astronomers engaged in a personal verification and completion of the earlier French Triangulations for as we have heard, one night he had come across them hot on the trail at Boulogne, the English beacon still twinkling across the water. At home, in his own work it became essential to determine the difference of longitude between the two instruments, (at Slough and at Blackman Street), used by Herschel and South in their Review of Sir William Herschel's Catalogue, and so, he gained for himself practical experience by plodding through many laborious bye-paths in the quest. e.g. With Captain Copeland R.N., "young Banks" and South, Herschel spent various cold and dark nights in January well wrapped in travelling capes but eleven out of twelve Rockets discharged on Richmond Hill hung fire on the first occasion. South then detailed a plan for young Banks to climb the Hill again with the Rockets and paraphernalia, as near the summit as practicable in the dark. "Commence firing at 7.20.G.M.T. and continue firing one every five minutes. If all (stars named) are observed with anything like accuracy the Clock's error at the place of observation" will be ascertained.

To Herschel the need for a complete Trigonometrical Survey of the World became positively imperative. He writes off to Fallows at the Cape: "It is my earnest wish to see a Trigonometrical operation commence on a very large scale and an arc of the Meridian, having your Observatory for its southern point, measured ... and which in process of time, or perhaps of centuries may belt the Continent of Africa from North to South. But without indulging in visions we may fairly hope for 10 or 12 (arcs) before this generation shall have passed away."

South's instrument stood in a little building specially erected. He expected to get his out-of-pocket expenses indemnified by the Board of Longitude (Chairman Dr. Young) but, as usual with South, the elements of what he calls "an awful crisis" developed. Upon which he announced that should Dr. Young "unfortunately show any supercilious or haughty conduct I shall at once without further ceremony go to the press". It does not seem obvious why the Board should pay such expenses. The question of the venality of the Board arose later when Herschel retired.

At the Royal Society & at the Astronomical Society the perpetual recurrence of petty quarrels and personal attacks, the very life and soul of a certain section of the Societies, was continually wasting their time and energy. These became a nightmare to Herschel till he frequented their Meetings as seldom as possible, for unlike South and Babbage, he was no fighter just for the sake of fighting.

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[x] P. L. Guinand 17--? - 1824. Worked in Munich with Fraunhofer. His son carried on the art in Paris and in the Revolution of 1848 it was taken on by the celebrated glass firm of Birmingham, Messrs Chance.

[x2] see back p 151.

A well-known "row" stamped its noisy way through the year following the election of Sir H. Davy. About that one Herschel writes to Babbage: "I am afraid there is likely to be a horrible rumpus in the Astronomical owing to the Article in Tilloch about Sir Joseph." Herschel calls it "virulent and indigestible and a foul stigma on the Astr: Soc: and unless that is removed the A.S. is no more." He more than suspected the name of the author. The storm-waves rose high and sprayed friend and foe alike, yet in after years it all seemed so childish to Herschel that he produced it for the amusement of his own nursery-party in a play called "The Infantile Society".[x']

Herschel found that social ties re-united the more readily from the constant visits to London entailed by official duties on the Council (R.S.) or as Foreign Sec: (Astronomical Society). Many friends desired his company at dinner. From these convivialities he carried away several good anecdotes: The celebrated surgeon Abernethy in order to test "the extremity of pain" had one of his own teeth half-drawn and, after a pause, finally extracted! But Abernethy was afraid of gunpowder, his joy was great when his flintlock gun missed fire out shooting! Another note tells us of Sir Joseph Banks: "seated on floor to have tooth drawn by Welch barber, and bumped about on his seat round room!" Of Napoleon, Herschel heard of "the state of Bonaparte's body after death. His stomach was entirely corroded so as to destroy utterly its digestive and assimilating functions, yet so far from being emaciated, an inch and a half of healthy fat was found on the abdomen." // The death of Napoleon in 1821 closed an era. Such men as Sir William Hamilton[x''] said: "The 'Concert' is quite spoilt, for this fellow has been playing first fiddle all my time", and James Grahame too felt as if "a Star had gone out, or a continent had sunk in the sea".

Herschel had a great day with Miss Maria Edgeworth and her sisters Fanny and Harriet, planned by Major & Mrs. Kater. They all met at breakfast and struck up a warm friendship, going afterwards to Burford's "Marina Panorama" and Martin's Exhibition of pictures. A month later Lady Herschel invited the sisters with their brother Francis for a visit to Slough. The day passed gallantly. "After viewing the Telescopes etc. we went to Windsor and saw the Castle and St.George's Chapel. returned, dined.

[x'] See Diary 1864. ed.

[x''] Astronomer Royal, Scotland.

Stargazing and singing[x'] finished the day." Next morning they left. A firm friendship developed and Herschel visited Edgworthstown in 1827. On another occasion he called in Cavendish Square on Mrs. Baillie, sister-in-law of the poetess Joanna Baillie whom he found visiting there from Hampstead. The latter had inveigled Herschel into sending her some poems for publication which he had written previously: ① "The Lark". This, she said was a "beautiful animated thing. ② "The Lament" and ③ "The Sailor's Departure" she pronounced "elegant and tender". Sad to say his muse appeared to be moribund. Of the one he produced at the present time she wrote severely, doubtless surprising our author not a little. She said "This savours too much of a learned Wrangler who considers poetry as a mere plaything undeserving of either time or consideration. Pray think upon this and let me have something more to my fancy". In enclosing the luckless poem Herschel must have irritated her (as he could irritate Grahame) by supercilious affectation. He referred to having composed it in a stage-coach and in all the clatter of scouring rooms and passages. Miss Baillie in a final apology rubs it well in. "Forgive the liberty I have taken with you ... I speak to my young poets as I do not venture to do to my old ones". In later years Herschel experimented with Whewell in English hexameters translating Schiller's "Spatziergang" (a German poem also in hexameter verse) Few people admired it except as a noteworthy effort. His Translation of Homer's "Iliad" written in the last years of his life had only the 'succès d'éstime' usual in such circumstances, a biting criticism of it by an old classical scholar being that "though the lines are spirited and give one a very good idea of the 'Iliad', the version has one great defect, it is not poetical".

One day when Herschel was lodging in Downing Street he tells us "A Mr. Jenkins came who discovered the solubility of wood in coal-tar under 3 or 4 atmospheric pressures and at a heat of about 460°." No doubt Sir Robert Seppings F.R.S sent this inventor to Herschel. Within 2 months the R.S. Council, meeting (in this very practical cause) relative to the "application of coal-tar to ships", appointed a Coal-Tar Committee. By the middle of May, Herschel and other members of the said Committee were off to Deptford starting from the Tower of London in the Navy Barge to examine "H.M.S. "Russell" 74 which is thoroughly injected with coal-tar (4500 galls.)," and "Eolus" 40, which they also boarded to see "the disposal of the timbers (the decks not yet being laid) according to the new rates for a round stern".[x''] They saw the magnificence of the "Royal Sovereign" Yacht, her gilding alone cost £3000. Returning from this

[x''] see above p 104

[x'] Herschel himself sang duets. Perhaps his was a baritone voice. He also played the flute.

inspection Sir R. Seppings, Surveyor of the R.N.(F.R.S.), told him the following particulars as they rowed up the river: "Coal-tar is a security against rats: When a very large vessel was only partially injected a dreadful commotion took place among the rats. They left the hold en masse and came on deck, running about in a panic, climbing the masts and rigging and were hunted, frightened, and knocked into the sea by hundreds. The Rats of London are all troubled with the stone in the bladder - observed by a London Instrument maker who wanted rats' bladders to make hygrometers and found the London rats would not do!"[x]

For the Annual Visitation Herschel breakfasted a select party, Babbage, Peacock, Whewell and South at Downing Street, being due at Greenwich Observatory at 2 o'clock. They sailed in a Wherry from Westminster Bridge to London Bridge. "Shot London Bridge[x] in a coal barge, Rapids." Then (presumably in another Wherry) sailed on to Greenwich. Resulting from this Visitation ("honoured by Prince Christian of Denmark with his presence and a speech"), Herschel arranged details with the Prince's Secretary for a Royal visit to Slough:

Extract from Diary. June 18, 1822. Prince Christian of Denmark, his Princess (Caroline Amelia) and suite; visit to Slough. Did the honours. The Princess a very pretty woman 28 or 30. The Prince wants address and is a little stiff but seems to be an observer, at least he noticed several minutiæ. He knew Fresnel (without my mentioning his name), but when I mentioned Biot seemed to recollect his name with an effort."

In the summer Herschel had some happy and uproarious days. The Rev. Richard Jones invited him down to Brasted Vicarage, there to meet Peacock and Whewell. He travelled

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[x] See 18 Chest W.H.

[x] Shooting the "rapids" through the narrow arches was a fine art of the London Watermen & was always risky. Seven arches of Old London Bridge were obstructed by the City Waterworks with immense water-wheels & the "Starlings" built round the piers. These dammed up the flood-tide till the level was 5 feet higher above the bridge than below, consequently during the ebb-tide all this water rushed back through the only available arches with roaring force. Herschel's adventure must have been one of the last. The system was condemned in 1822 after 240 years of a thunderous life audible far away within the City.

the 30 miles down in "the coach from 2 Sweeting alley - (an umbrella shop) - leaving at 3.30 every day." Under convivial leadership by Jones the 4 men had 3 or 4 rollicking days including a wild expedition up Ide Hill. "Jones and Peacock in gig, Whewell and I on horseback. N.B. High trotting horse and mad riders". A few days afterwards the axletree of the gig broke. "A wonder it lasted so long" said the wheelwright. (Jones baited his next invitation with the news that "Mrs. Jones has got a new poney 'chaise á quatre' in which she will drive you where you like.") Finally Herschel, Peacock and Whewell left Brasted in the highest spirits. They shared a postchaise across country to Cambridge singing choruses as they approached the town, a fitting prelude to the solemnities of 'Commencement' which followed. "Commencement Ball" that evening, Herschel danced with some "rather flirting young woman, the youngest rather pretty". Very early next morning he rushed off for a 6 hours run on the "Safety" Coach and reached London in time for the Council Meeting of the Royal Society.

Now being uneasy about the news from home John took the Windsor Coach to Slough. His Aunt, who was 72 was indeed very unwell. She writes of it as "a bilious fever" and records that she is "in dayly (sic) expectation of going" before her dear Brother and in utter despair about the bestowal of her few properties. But after John appeared in her room she is a changed woman. Like an old war-horse, his trumpet-call aroused her, for John, very astutely, implored her to get better for his Father's sake, it would be the death of him if "anything" happened to her. She pulled herself together, settled all her little money affairs safely during the next few weeks and then whole-heartedly devoted herself to her brother in his increasing languor.

John's friend James Grahame had recently lost a great part of his income, so much so that he told Herschel "My losses have been very considerable. I have taken a small but nice house and dismissed my man-servant (that was indeed a step so retrogressive that I did not like the prospect of it)". But now Grahame seems to feel need for a change from Edinburgh. He invites Herschel to join him in a Tour about the Netherlands, his idea being to sail to London from Leith and then across with Herschel for a fortnight or so in Holland. "I wish to go to Lisle in order to visit the Governor, Marshal Cambrone[x] (sic) of whom I have heard from Mr. Clarkson a very high character.

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[x] Marshal Cambronne, famous for his exclamation at Waterloo, commonly called 'Le mot de Cambronne' by the ladies!! A well-known expletive.

I can obtain a letter of introduction to him and I have a claim on his good graces because I was Counsel for him lately in a cause of great importance defending in our Court here, which we gained to his very great joy".

Herschel accepted, though subject to the uncertainty of his old father's health. By August 2nd Grahame arrived at Blackheath from Leith in the steamer "John Watt". He remained in London a week arranging Passports and meeting Richard Jones at a jolly dinner at Wiltshire's in the City[x'] Herschel gave this dinner because as he told Jones, "I wish my friends to know and love one another".

Herschel's Diary. Aug.8th: "Left London for Dover in company with Grahame for a tour in Holland and the Netherlands."

[x'] Herschel's Diary. "Saw a large turtle (80 lbs.) killed or rather decapitated and opened, for it seemed nearly as much alive after the operation as before".

HOLLAND AND BELGIUM.

Thursday Aug.8th to Sunday Sept.1st. 1822.

This morning James Grahame and myself after taking leave of Jones in Downing Street, took our departure for Dover in the coach from Piccadilly, taking in tow John Gibson as 'cavaliere servante'. We stopped a short time at Gravesend. Noticed the sheds over the Ships in the Dockyard at Chatham. The Shipping dismantled, roofed over and painted white to preserve them from weather. Reached Dover at half past 9 p.m.

Left Dover Pier 12.55. Wind South. Engine 40 horse, 2 of 20 each. Passage of 3hr.20 mins.[x²] Swell.[x']

Bergues. 1½ post. Fortified town. Ruinous ramparts and runs all the way by the Canal de St.Omer about 100 ft. broad.

"Ou allons nous?" "Entrons ici."

To Cassel, fine road along a very rich country with woods and highly cultivated large potato crops, witch-elm and tall aspen. Cassel on an insulated eminence 200ft. of a soft sand in midst of extensive flat of most untidy wooded and well cultivated country. Fruit Woman talked French to me and Dutch to her companion. Superb point of view from the Prison looking north to Dinkirk. Sea seen.

From hence to Lisle 2 p. the route is less interesting. Lisle. Hotel du Gand. A considerable Inn in the principal square. The houses are large, of stone with a profusion of sculptured ornaments, grotesque figures and festoons etc., carved on their fronts, high ridged slated roofs etc. After a disgraceful scene of extortion from the Douane in which 5 francs were hardly held a sufficient bribe to preserve us from the delay and inconvenience of a search of luggage (extorted under a pretence of an escort of 2 gendarmes) we got some dinner and Grahame proceeded to deliver a letter at General Cambrone's[x³] who invited us to spend the evening there. We went accordingly about 7½ or 8. and found a party of the General and his wife (a Scotch-woman who had lost her national appearance and manner and adopted the French so completely as to render it doubtful to what nation she belonged.) The General's A.D.C. and

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x' A Concession to Grahame.

x² Friday. Went to Calais to pick up his carriage of last year. To Dunkirk in his own carriage. Gate incident. (See Aug.14th).

x³ (Consistently misspelt) "Gen: Cambronne," famous at Waterloo where he was made prisoner by a young Hussar Lt. Halkett & uttered the exclamation known in England as a high sounding sentiment, but not so in France — La Garde se meurt elle ne se rend pas.

several other ladies and gentlemen, in morning dresses. After a few moments' conversation the whole party sat down to cards ..... When our game was ended we found we had been playing for the stake of 5 sous and immediately after the party broke up.

Sunday morning, 11th. A formal invitation to dinner with the Cambrones having been accepted and the acceptance acknowledged by another message. General C. called on us while at breakfast. He spoke of his (blacked out) "imprisonment at Ashburton" - residence 6 months in England at Ashburton near Portsmouth and I collected from his expressions that it was as a prisoner. He spoke, however, of the hardships to which French prisoners were subjected in England as arising in great measure from the peculiar situation of England, without fortified towns or places of security and without the summary means of detention and apprehension which governments have in the continental states. At the gates of a fortified town every person is liable to a search, even to undressing. No person, not even a Frenchman can pass from one part of France to another, without a passport, for more than six leagues from his place of abode, and the passport must be renewed at the expiration of a year. N.B. The military command of Lille is divided between the Marquis Jumilhac and Cambrone, the former commanding 2 departments the latter one.

At 10½ went to see the Lottery drawn. The Lottery in France, in 5 departments, one drawn in Paris, one in Each of 4 principal Towns of which Lisle and Lyons are 2. Each Lottery has 90 numbers, 5 of which are drawn at each tirage. An adventurer puts any stake he pleases from 1 fr. to as many millions as he likes on any single number, or any pair, 3, 4 or 5. If the number he has chosen be drawn he gains .... twice his stake. [If he has chosen 2 numbers and both are amongst the 5 drawn (if chosen as a pair) he gains ... times, if a combination of 3 be all successful ..... . If of 4 170,000 times. If 5 ..... times.] The combinations against a quatrain are enormous ..... to one, and it may serve to give an idea of the extent to which the lottery is played to be told that the drawing of a quatrain happens 8 or 10 times a year. The Lisle Lottery is drawn twice a (week) once in Lisle, once in Paris and the result at one place is known in 10 minutes by Telegraph at the other place (60 leagues). It is not uncommon to have 50 or 60,000 frs. staked on one Tirage. Great expectations were raised at today's Lottery of No.39 being drawn, it not having been drawn for 2 years. It is said Government would lose 10 million francs on it. It was not drawn. Tirage is held in a chapel with great ceremony.

We next visited the Collection of Pictures and the Library in the Museum. The Library contains perhaps 10,000 volumes, classed methodically ... much about the Dutch Settlements in East India.

Returned, dressed and went to General Cambrone's to Dinner. Present his A.D.C. (Rivaux by name) and wife and a little girl Sophie Anderson. N.B. The General pressed us extremely to eat and drink and we could scarce avoid over-drinking, tho' the Champagne was very bad, the General and family are on the point of quitting Lille and retiring from Service, having served his 30 years, being lame etc.

General C. and M. Rivaux accompanied us to see the Citadel, a vast fortification including a little town of Barracks and situated just out of the Town. It is said to be Vauban's masterpiece.

During our walk Cambrone and I shewed ourselves above the Rampart and presently without regard to C's high military command, his own sentinel ordered him to descend, which we did he only observing that "pour commander il faut savoir obeir". After this little piece of authority, the same sentinel went thro' all the usual evolutions as his commanding officer passed him, taking his station on the rampart, turning his face outwards to face the enemy and his back to the General. This done we returned to the Town and took a stroll and a seat on the Promenade just within the gate under an avenue of Trees. Being a lovely Sunday evening a vast number of people (2 or 300 perhaps) were walking or sitting. The latter chiefly the beau monde. Among all the assemblage of this evening there was no-one whose personal appearance seemed calculated to excite a lively sensation in any but a very susceptible bosom yet on the whole the absence of ugliness was striking and pleasing.

As we sate, Grahame and the A.D.C. turned the conversation on to Buonaparte's death and, by way of encouraging the turn of it, I alluded to O'Meara's book "The Voice from St.Helena", in such a way as I thought could not offend but might give rise to an expression of sentiment - The General however appeared very guarded on this point and presently rising led the way to the house of M. Collet where we found Mme. Cambrone. (Footnote. Indeed I afterwards found it was one of peculiar delicacy, Buonaparte having left him a legacy of 150,000 frs. which it is doubtful whether the present

Government will allow to stand good.) A few ladies and gentlemen dropped in in the evening and a party at "Boston" was made up for those who chose to play which (being Sunday) we declined. I had a good deal of conversation with M. Collet, he is a Constitutional Monarchist and when I observed that the forms of monarchy with the spirit of a Republic, composed the Government best fitted for a large territory he declared the sentiment met his full approbation.

In Lille a large quantity of a species of lace called 'Tulle' is manufactured by machinery, there are also spinning mills on the English construction, the mechanism being introduced by English workmen of whom a great number have lately come over. In consequence this neighbourhood is increasing rapidly in its manufactures.

Monday, August 12th. G. and I went to pay our farewell visit to General and Mme. Cambrone. Our parting with G. was very cordial. Mme. C. spoke much of the General's present and future prospects and it was easy to gather that he is disgusted with his present situation. 30 yrs. of desperate service, with 25 wounds and the experience of so many reverses are enough to cure most men of ambition and Cambrone has no longer any other than to retire and be quiet and has accordingly tendered his resignation of his post at Lille. Should it be accepted, of which his wife expressed some doubt, he will have only a retiring pension equal to a third of his half-pay and a very limited income on which they propose to live at a pretty estate near Nantes. His present post Mme. C. observed is one of great drudgery "there are perpetually conspirations" said she, "going on".

At 11½ we left Lille. Passed many fields of beetroot. Presently we passed the frontier of the Netherlands where the French douanier merely said: "Bonjour" and the Flemish one behaved well doing his duty but not vigorously and refusing a douceur which we had been told at Lille it was a matter of course to offer with: "Pardon, Monsieur".

Stopped for the evening at Tournay. Tournay is fortified, the works being formed of a blue, tough, slaty limestone from the quarries of Charleroi, which effervesces strongly with acid.

The French in the Revolution robbed this Cathedral of all its plate and silver and even took up and sold by auction the marble pavement.

Thursday 13th. 5.2 a.m. Therm: 67. At 5.20 on route. Walked to see the Maison du Commune, qui n'est rien.

From Mal, instead of taking the direct road to Brussels we launched off to Waterloo making a bargain for 50 frs. with the Landlord to furnish two horses to convey us through Mt.St.Jean to Brussels (he first asked 60 fr. and 30 I found on enquiry would have paid him amply, so he is a cheat).

The road to Waterloo lies through Braine la Linde. the position of the right wing of the British forces and is dreadful, being up to the axles in sand and very uneven, here and there trees are laid down to mend it. The country is beautiful, rising and falling in gentle undulations between which nestle sweet cottages and farm-houses among sheltering trees and orchards, nothing can be more peaceful and retired ..... (Space left for an intended description of the field).

Wednesday. August 14th 1822. Brussels.

11.50 midnight 64.9. stars brilliant, moon sunk.

We first proceeded to a person, M. Simon, Rue d'or, recommended by Monsieur (?) of Calais, to whom I sold my carriage for 250 frs. being a ¼ of what I gave for it at Dijon, it was, however, now quite unserviceable, the wheels being almost destroyed by plunging into a hole in the pavée through the forest of Soignies in the dark which almost upset us. This done we visited the museum. Going along with M. Simon to his house (where he seems very well-off) we met the Duke of Wellington who is come to inspect the fortifications of Namur and other frontier towns of Flanders. Between dinner and tea we visited the Cathedral a vast and venerable pile but more striking in the interior than without. The painted glass is indeed superb and in the utmost profusion.

Thursday, August 15th. At 7 in the morning after giving the waiter a letter to my Mother with 90 centimes pour l'affrachir (double the proper sum) we set off in the Antwerp diligence, a moving mansion carrying 9 inside and with room enough for double the number. Its exterior appearance is almost that of a broad-wheeled waggon and the massive iron and woodwork about it would build a man of War's long-boat. However, it went 7 or 8 miles an hour and very comfortably with plenty of ease and elbow-room. The road runs by the Antwerp Canal, which is a fine line of water about 60 ft. broad with many large Trekschuyts drawn at a trot by 4 small horses with a mounted postilion.

* see p.153 & 167

At no great distance from Brussels on the Canal bank is an enormous Prison in which at the present time are confined 1500 persons for debt and crimes. Criminals are obliged to work and a portion of what they earn kept for them till they are let out; some have received 3 or 400 francs on regaining their liberty. Nobility is no security in the Netherlands against imprisonment for debt, and 3 months ago Baron von ....steen who was running away from his creditors, was overtaken by 4 gendarmes and clapped here under lock and key.

As soon as we arrived at Antwerp I set forth to look for the Cathedral, but missing it, found myself at the door of the collection of fine arts, "Bildende Kunsten" where (as a stranger being admitted without a ticket,) I found an Exhibition of Modern Paintings by living artists. Grahame met - as we were walking - with an old schoolfellow in a very accidental way. His eye was caught by "India Silks" over a shop and the English words induced him to look at the name on the door which was "Bayley".

Bayley had joined the Spanish Army and in 14 days from leaving Glasgow College was in the Battle of Talavera, after this he received two wounds at Badajos, was nursed by a young Flamande, fell in love with, and married her. She was heiress of a Silk manufacturer at Antwerp and her husband, quitting the army where hard knocks were all he seemed likely to get, entered on the business and is making a rapid fortune.

Meanwhile I had been visiting the Cathedral whose beautiful Spire, the admiration of the world is seen from every open part of the Town. But the first object which arrested my eye on entering the Church was "The Descent from the Cross" and on this I continued to gaze until I quitted the Church. It is not in the power of my description to give an adequate idea of this wonderful picture.

After dinner Grahame and I again visited the Cathedral and while he sat looking at "The Descent from the Cross", I ascended the Steeple, which is 466 ft. (French) (or ..... English) high, whence a complete view of the Town and flat surrounding Country with the course of the Scheldt winding "like a blue swollen snake" down to Middleburg, Flushing and Walcheren, is obtained. Here the wind carried off my hat, which I never saw more.

In the evening we set forth to a promenade beyond the gates where we were told the population of Antwerp would be assembled but got to the gate after it was shut and found such a crowd struggling to get in that it was in vain to attempt getting out. This system of closing the gates of fortified towns at early hours is one of the most provoking grievances the travellers are subjected to. In the Netherlands and in Holland, a certain sum paid will always admit one, but in France it depends on the mere caprice of the "Fonctionnaires", as an adventure at Dunkerk will witness. In the one case it is a mere engine of extortion in the other mere vexatious tyranny or a means of extortion in the hands of petty officers.

Returning disappointed we passed the "Maison des Gauffres" an immense coffee-house, or rather beer-house which our little conductor told us was one of the finest places in the world. Accordingly we entered and found a scene not easily described. An immense saloon near 100 ft. long brilliantly lighted with small tables all down the middle and sides and crowded with company of all ranks and appearances, Dandy, Merchants, clerks, elbowing their masters, their masters sober and solemn with their wives and daughters, well-dressed and perfectly respectable women, greasy butchers in blue frocks and fish-women in frowsy bed-gowns, all promiscuously muddled together and sitting around the tables with beer or spirits before them. To drink these elegant beverages seemed the universal employment of both men and women but the proud superiority of smoking tobacco* was reserved for man alone.

Friday, August 16th. 1822. Morning at 9 a.m. Therm:62. After dinner we called on Mr. Bailey (sic) and were introduced to his wife a sweet, modest, domestic and very pretty young woman. After taking coffee and wine Mrs. Bailey accompanied us to some shops to purchase some toys for Grahame's children etc.

During our walk with Mrs. B. we learnt some particulars relative to the trade and mode of life of the Antwerpians.

The trade of Antwerp is rapidly increasing, their merchants still keep on the safe side of the old Dutch produce, cautiously laying by annually one third of their income, giving little credit and requiring little and above all regularly balancing their accounts every month. They are not hospitable but when occasion absolutely requires it, give unwieldly, pompous dinners of 10 courses or more which endure several hours and in which it is considered rude not to eat of every dish!

Saturday, August 17th, 1822. Left Antwerp in the Breda Diligence. From this point we may regard ourselves as fairly in Holland and the expence of travelling etc. is suddenly doubled. The country continues mere sand

*See Diary of J.W.H. 12th Jan 1823" Anecdote of Dutch boys who have to learn to smoke at school. Three cigars a week in a locked attic!"

but a moist and not barren sand. The road is paved with bricks set on edge and is beautifully smooth and raised on a mound above the flat country, this mode of road-making continues throughout Holland and wherever it is not practised the sand is almost impassable to carriages.

Between Breda and Utrecht the country assumes a new character. For a great distance the road winds by the side of a great canal or sluggish, streamless river whose course is marked by beds of reeds on either side like standing corn. Dank willows and aspens hem it in and obstruct any distant view and a vast quantity of hemp is cultivated in the low grounds. At intervals single houses either thatched, like farm-houses or neat, trim, slated villas occur, each surrounded by ditches of greater or less breadth branching from the main canal, enclosing a piece of ground of a rectangular form, crossed by a half-decayed wooden bridge and navigated by an old boat which, like "the grim ferry man's" looks as if it would groan and open at all its seams if oppressed by the weight of any earthly boatman. Few inhabitants are seen but here and there a Dutchman fishing or lazily cutting up the weeds in the ditches with a hook at the end of a long pole.

There is no describing the dreary impression such a country leaves on the mind. In spite of the neatness and apparent comfort of the single houses and the clean trimness of the frequent villages, still they appear but refuges from desolation and the desart (sic) seems at every man's door. Whenever the close-set willows allow a glimpse to any distance from the road, boundless and trackless plains are seen in undistinguished succession where all landmarks are lost and where the wearied eye flies from sickly verdure to rest on putrid water.

Sunday, August 18th. 1822. Utrecht is a huge but very uninteresting city. We paraded some of the principal streets to leave a letter at Professor Moll's (who with his wife is in England but is expected in a fortnight).

We left Utrecht in the Treckschuyt at 1.0 o'clock for Amsterdam having secured to ourselves a refuge (though an imperfect one) from the eddying tobacco smoke which rolled in volumes through every other part of the vessel, by taking the Roef or back-cabin to ourselves.

Just before the Treckschuyt started a man came round with a pot at the end of a long pole to make a collection for the poor on the part - as he said - of the Burgomaster of Utrecht.

Our surly steersman, when he saw me making a sketch of his boat, showed some signs of interest and told me to write over it: "Von Amsterdam", and as I did not immediately do so, wanted to take the pencil out of my hand to write it himself and would not be pacified till I showed it him written in full form over it.

Monday, August 19th, 1822. Amsterdam. This morning Grahame and myself after visiting the Museum called on Mr. Crommelin one of the principal Merchants of the place to whom G. had two letters. We found him a staid frigid person inclined to show us just as much attention as could be done without putting himself the least out of the way. Accordingly he changed me some bank-notes into the clumsy & inconvenient coin of this country[x]. Gave us a letter of introduction to General van Bosch, of Friederick-Oort.

[x] (Note. The large quantity of silver one is forced to carry about is a most serious inconvenience. People carry small canvas sacks for purses. N.B. On my return I weighed some of the coin - dated 1793, 1687, 1738 - nearly ⅛ lost by clipping.)

I returned to the Hotel after visiting M.Delachaux a bookseller of whom I had some enquiries to make, procuring a letter from Home at the Post Office, waiting for the signature of our passports. This department of public business seems very ill-managed here. Grahame and I looked for a moment into a Spiel-house — a kind of Wapping flash-house, under the surveillance of the Police and found that the stories of merchants with their wives and daughters frequenting these sinks of abomination are gross misrepresentations of national manners. Their authors have been misled by mistaking such Coffee-houses as the Maison des Gauffres at Antwerp for the Spielhous's.

Tuesday, August 20th, 1822. This morning at 6 set off in Diligence for Deventer on our way to Frederick's Oort. Coasting the Zuyder See (but out of sight of it, only the masts and sails of the shipping on it being seen, over the flat green meadows) reached Naarden, a strong fortification and military post. Beyond this the country becomes more and more desert, the sand being only covered with heath and low brushwood of oak and alder.

At Naarden we bid a temporary adieu to canals, rivers and ditches, there are even some gentle deviations of ground which may be called hills between Amersfoort (where we dined) and Deventer.

The sandy nature of the whole of Holland renders the roads almost impassable unless paved. The pavement is, in fact, a brick wall laid horizontally consisting of small hard white bricks set on their edges. They make the most beautiful of roads which are the property of a Company whose shares (of £100 each) pay 6 per cent and are protected by Government and allowed certain privileges. But the travelling is not commensurate to the goodness of the roads. To see the driver of the Diligence cautiously reining in his 4 fine horses to the dull walk of a funeral just when a gentle slope invites an English Coachman to make his most brilliant display of speed - moved my spleen more than once.

The first mile of a new "relai" is always performed at a walk and the pair never attain a swinging trot. At every 5 or 6 miles there is a halt of a quarter of an hour. The machine is dragged into a barn with folding doors, and the horses cherished with huge slices of black bread which they devour greedily.

(Footnote:- The English rule of keeping the left side of the road in driving when one meets a carriage and the right when passing is inverted in Holland. They pass in the most awkward manner and slacken their pace fifty yards before meeting.)

Before Amersfoort passed the Palace of Suysdeck, a large white house with wings in a crescent form, surrounded with a forest, and near Appeldoorn (a mere relay-station) another royal palace, a tall white house at the end of an avenue, called Loo.

Deventer is a decent town on the Neiser R. Travelling from Deventer we took post-horses and a kind of vehicle between a cart and a Cabriolet, with two cross benches, clumsy, jolting, and dirty, hung on leather straps without springs and proceeded over a vile, sandy road about 15 miles to Zivell by starlight, stopping at a little village called Vege about half-way, where we knocked up the people and fortified our stomachs with a glass of brandy.

[Note. Convenience is so little studied in Holland that the simple contrivance of a stated toll paid weekly or monthly by a diligence has not occurred. The Diligence was actually stopped at Deventer gate till each passenger had found a halfpenny.]

In this remote part of the country the civility of the Dutch peasantry is as striking as the boorishness of the people of business about the great towns. Every man respectfully pulls off his hat as you pass and they answer your questions with freedom and kindness.

The North Holland costume of female dress is singular. Those of some of the Friesland Farmers' wives are worth £3 or 400 and descend as heir-looms from Mother to Daughter. I saw two very splendid head-dresses of this kind, of the richest Brussels lace looped back from the eyes with broad gold clasps coming exactly up to the corner of the eyes - almost like spectacles, on the heads of two females in the pit of Amsterdam theatre, the rest of whose dress was the reverse of rich - evidently country people.

We found General van Bosch not at home, at least so we were told, but had reason to believe to the contrary, however, after wandering a little about the Colony and entering several of the cottages etc. we called again and the General's son accompanied us to the Spinning House - (a stupid boy about 16 from whom we could get no information). However, we looked in and saw a number of healthy-looking boys spinning coarse woolen (sic) thread with large hand-wheels and visited the deposit of clothes, linen etc. manufactured in the Colony.

At length the General who had received our letter and cards came out to meet us and to my surprise, I recognized in him the very individual whom Babbage and myself found closetted with M. Fellenberg at Hofwyl[x1] and whom we both believed to be Baron von Keverberg[x2] He mutually recognized me and we immediately proceeded to make our enquiries respecting the Colony.

Van Bosch is a plain, practical, unvisionary man who respects and acts on general principles of benevolence and good sense without making unnecessary parade about them. Accordingly at Friedericks Oort there is no theatrical effect, everything is coarse, simple and unpretending. The nature of the establishment has been sadly belied by foolish enthusiasts who admire it on wrong principles, among whom Baron von Keverberg[x2] must be reckoned. His preface to Van Bosch's simple exposé is calculated to give the most inadequate notions of it and to disgust any sensible man. From reading this I went with great prejudices against it but am now satisfied they are unfounded.

The Colony of Friedericks Oort is neither a Paradise upon earth nor the center (sic) of a new field of civilization, nor the basis of a new era of social order, nor anything else that is visionary or fanatical. It is simply a receptacle for the indigent who are inclined to labour but cannot find in Society the means of applying their labour to advantage; a receptacle where by the loan of a small capital, (in tools and furniture) a cottage and ground and, by instruction in

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[x1] See Journey in 1821. p 152 and Hemmerson p 356

[x2] do. do.

agriculture and useful arts, they are enabled to gain somewhat more than a bare subsistance, to maintain their families, to pay off by degrees the debt contracted at their entry and perhaps, if industrious and well-behaved, to accumulate a small capital of their own and to go forth again to commence the world anew with acquired habits of industry and regularity.

Nothing can be more improper than the name of Colony for such an Establishment. The "Colonists" cultivate land which is not, nor can become, their own property, and which, so far from descending to their children must pass at the death of the parents into the hands of strangers. A man may make up his mind to settle at Fr:Oort for life, but never hope to establish his family there. All the children of the colonists, on attaining years of discretion, being sent away either apprenticed to trades, enlisted for soldiers (if willing), or sent to seek their fortune for themselves with such help as their parents can afford them. When a new family settles in the Colony, a cottage is built them and 7 acres of sandy heath, such as all the country about consists of, of a most unpromising quality committed to their cultivation. They are supplied with furniture, tools, provisions and clothing etc., by the Society to whom the land belongs and are held their debtors to the amount. Meanwhile they are instructed in the proper course to be pursued to bring the land into cultivation and indeed are obliged to conform to a certain routine of husbandry, which has been found so successful as to render the soil sufficiently productive at the expiration of three years to maintain its cultivators - (a fact striking in itself when it is considered that the soil is simply sand with a thin coating of stunted heath on it but without an atom of argillaceous matter).

Meanwhile the wife and children of the Colonists are employed in spinning and manufacturing the coarse cloth and linen which clothes the Colonists (for all their clothing is their own manufacture or at least made within their precincts).

No sooner does the third year terminate (if the Colonist be sufficiently industrious) than the produce of his land and the labour of his family exceed his expenditure for necessaries and he begins to pay off his debt. This once done, if his conduct has been good etc. (gap) the Silver Medal is given to him and he is from the moment a free agent.

The Colonists who have not the Silver Medal are subjected to stricter regulations. They are regarded in some degree as articled labourers, work at regular hours, must not be absent from their homes after 9 at night, must not quit the Colony till out of debt.

Every Colonist, man, woman or child, wears a kind of uniform dress of coarse materials manufactured within its precincts. Their shirts, sheets and other linen are in like manner manufactured in the Colony and are of the coarsest and strongest texture. No refinements in this respect are allowed, bare comfort and defence from the weather is all that is desired.

In short, the Colony of Friedericks-Oort is to Holland in general what a poor house on the best possible plan would be to an English Parish, but possessing advantages no poor-house can ever attain. It is divided at present into 8 villages comprising together about 2300-2400 Colonists, who are generally orderly, industrious and contented.

The funds necessary for the purchase of the land, farming-stock etc. are supplied by the subscriptions of a Society of about 50,000 persons who pay 50 sous (half a crown) per annum besides what they may choose to contribute over and above. Prince Frederick patronizes it and it is gaining ground rapidly.

Thursday, August 22nd, 1822. Went to Deventer and secured places in the Diligence for Amsterdam after which we posted on 2 stages farther to Voorthuis to sleep and avoid having to rise at 5 next morning, where however we found miserable accommodation enough. Here we got a ridiculous enough alarm which kept us awake with laughing for some time.

We occupied one apartment and I had already got into bed - Grahame was lying half-undressed on his and relating a singular circumstance relative to Mr. and Mrs. Bonar, whose horrible murder caused so much sensation. They were once on a visit at Whitehall and on some occasion Mrs. B. remarked to Mr. Grahame that they always lay with the door of their sleeping apartment open. Mr. Grahame observed on the impropriety, or even danger, of this practice, adding "my dear Madam, you and Mr. Bonar will certainly be murdered some night in your beds." This prophecy was literally fulfilled. The murderer, one of their own servants, confessed that in crossing a passage to go to bed, the idea of murdering his master and mistress suddenly came into his head and snatching up the first weapon that came to hand, without a moment's deliberation, when the least obstacle, a closed door or a drawn curtain, might have given him time to reflect, he perpetrated a deed for which the annals of murder have scarce a parallel.

Our door, having no fastening, and the room being very close, had been left wide open, when just as the dismal tale had made its full impression, I perceived a shadow on the wall, and presently a rough blackguard-looking figure entered the room and marching up to Grahame's bedside, oiesed (sic) the candle which stood near. I started up and laid hold of him when it proved to be the stupid, half-idiot waiting-boy come, in the plenitude of his care for the safety of his master's house, to take away the candle, and who being free from the incumbrance of shoes or stockings had stolen upon our privacy with noiseless step and almost accomplished his desperate purpose before either of us were aware of his presence.

At Appledoorn (between Vorthuisen and Deventer) the postmaster who stood smoking at his door, spoke of the Colony of Friedericksoort in a strain of rational good sense and with views of general policy which surprised us. "Il faut commencer toujours par les moraliser" was one of his phrases, an idea put into words not to be expected in the mouth of a Dutch postmaster. But Appledoorn is only a mile or two from the Royal Residence of Loo. The King is there at present and our Postmaster gave us a favourable account at least of his attention to business, he always rises at 4 and writes till 9, frequently he continues at his writing-table the whole day.

Friday, August 23rd, 1822. The Diligence took us up at 10½ and at 12 we reached Amersfort meeting on our way the Prince of Orange and his Princess on their way from their Palace of Suysdyck to visit the King at Loo.

Dined at Amersfort where we met Mr. Coburn (sic) a young Englishman. On resuming our route we experienced the benefit of the regulations of the Diligence office respecting places. We had secured the three last places and taken tickets bearing the numbers 9, 10, 11, which we preserved and placing Gibson inside (with No.9, the Diligence carrying 9 insides !) took our seats together by the Driver in the Cabriolet for the benefit of each other's society and view of the Country. On attempting after dinner to resume our former seats a pragmatical Dutchman who had perched himself aloft refused to descend. It was in vain we remonstrated in bad French and worse Dutch and shewed him our tickets, he persisted and even held out against the instances of the postillion and one of the proprietors. Loud and high waxed the war of tongues and as our honour now became concerned we determined not to yield the point, when female feeling, ever alert on the side of justice decided the day in our favour. All the chambermaids and the fat landlady of the Inn joining our party and urging the wavering proprietor to a sense of his duty. Assailed on all sides, down slunk my Dutchman, muttering discontent, and we mounted in triumph and rode off among congratulatory nods, and smiles from the Nymphs whose aid had been so opportunely lent. Meanwhile the Dutchman's ill-humour vented itself on poor Gibson, whom he first wanted to turn out, but G. standing fast to his colours faced him out, on which he lighted his pipe and finding G. disliked tobacco, satiated his vengeance by puffing the smoke all the way in his face. (This latter particular we did not know till afterwards.) This was not the only good turn our tickets served us. They saved us at our outset from being crammed with 9 other human volcanos and suffocated with their smoke in a Beiwagen, or Supplement to the Diligence, a kind of covered cart which travels with the overflowings of the principal vehicle.

Saturday, August 24th, 1822. Amsterdam. I looked into the New Church (the principal one in Amsterdam) just as Divine Service had ended, the organ was playing the people out of the Church. All had their hats on in every part of the building. It was the King's Birthday and all the steeples and shipping were ornamented with flags.

Paid our visit to M. van Swinden. We found him a mild engaging old man, upwards of 80 years old, but preserving much of the readiness of youth. He showed me a portrait of my father and seemed much delighted when I assured him it was a striking likeness. (It was the Engraving from Sir W. Watson's picture.)

Van Swinden was the original proposer (it is said) of the Decimal System of weights and measures in France. We conversed on this subject and among other information I learnt from him that a General Krayenhif has just finished a very complete and accurate Survey of the Netherlands and Holland, making the last of Delambre's triangles the first of his.

Set off for Haarlem. In our way we called on Mr. Boorje, a shipbuilder to make some enquiries respecting the Truckschuyte, a friend of Grahame's being engaged in a canal concern (Mr. Robinson) and wanting information. I took the opportunity to cross examine Mr. B. on the state of shipbuilding in Holland and got permission to go on board a vessel of about 450 tons, in frame in his yard.

It was building under a roof, the timbers laid as usual, on the old plan, and Mr. B. assured me that the Diagonal System was totally unknown, or at least unpractised in any of the Dockyards public or private in Amsterdam.

Arrived at Haarlem we visited the Teylerian Museum: The great Electrical Machine whose exploits are so celebrated is still in high preservation. The jars of the batteries are at least ⅕inch thick and 20 inches high and each battery contains 25 jars. The combination formed by the union of 4 of these is said to have struck down an ox and, what is perhaps still more extraordinary, to have utterly destroyed the vitality of an eel.

The collection of minerals is superb. It is a "dandy" Museum.

Having deposited our Baggage and poor Gibson at the Golden Lion and got some luncheon, we went on to a small village about 1½ miles from Haarlem where we ordered dinner, strolled out in the environs to some bocages, bordering on the sand dunes which here edge the coast and rise to a considerable height (80 or 100 ft.), through a pretty, retired walk, returned, dined and took leave of two very agreeable young friends in whose conversation I learnt some curious particulars of the Dutch Commercial System.

The usury laws are fallen into such general neglect and disuse that no one ever thinks of referring to them and money is borrowed and lent at 10, 15 or 20 per cent without the slightest scruple. The man who would make illegal interest a plea for the non-fulfilment of his engagements, however oppressive, would be held infamous and no respectable Dutchman would ever deal with him. Most disputed points in commercial matters are referred to arbitration. The arbitrators are usually lawyers but in important cases one or two merchants are joined with them.

Sunday, August 25th, 1822. Attended Divine Service in the Great Church at Haarlem. It is a vast building and a proper receptacle for the noble organ it contains which is said to be the finest and most powerful in Europe, it is remarkably beautiful in its external appearance, being a pile occupying the whole west end of the Church. The pipes are silvered, the woodwork dull flesh-coloured shading into violet. The only pieces performed were psalms and the whole congregation joined so loudly (even the soldiers bawling at the top of their lungs) as almost to drown the Organ, yet now and then

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x) See Sopping's system. vd Copley Medal 1818 x' see ~~Examples~~

after a small prelude the Majority of sound rolled forth through all the building with an effect truly sublime. "..it came o'er my soul as doth the thunder, When with expected burst it threats the ear." We were treated with an extempore sermon of intolerable length of which we could not understand a word and had full leisure to attend to the odious peculiarities of the sound of the Dutch language which is a combination of yawing, hawking and gurgling in the throat, excrutiating to an ear of any delicacy. The congregation kept their hats on during all the sermon and indeed throughout the service except when God was especially addressed in prayer. This distinction was so nicely preserved that when the poor-bag was carried round, each man accompanied his offering (as an act of worship to God) with a reverential touch of his hat. The poor of Holland being maintained entirely by voluntary contributions, 4 men walked with velvet bags at the end of long sticks and little bells attached to collect, and this was twice repeated - almost every one gave (even the Common Soldiers or certain of them) each time.

The meat-market house at Haarlem is a singular instance of the old fantastic taste of building with pinnacles and tin ornaments along the ridge of the roof. [Among the curiosities in the Museum here I had really forgot the famous head of the Maestricht Crocodile.]

Left Haarlem in a Truckschuyt for the Hague by Leyden.

The way to Leyden being very dull (in spite of the company of a Musician's wife and her daughter, a pretty giggling girl of 14 or 15), I amused myself with drawing our sturdy old Skipper's picture.

Haarlem and Leyden are interesting in history for the famous sieges they sustained against the Spaniards under the Duke of Alva's forces, sieges whose recital chills the blood with horror at the fiendish cruelty of the besiegers and warms it with the almost superhuman endurance and devotion of the besieged in the cause of liberty. It is an instructive lesson to tyrants to see in the history of these wars how tyranny defeats its own object and excites a resistance which ultimately crushes the oppressor.

August 26th, 1822. The Hague. This morning I delivered a letter of introduction from M. Delachaux of Amsterdam to M. Flament, Librarian at the Bibliothèque Royale and spent the morning in examining books relative to Dutch Commerce. Flament is a stupid old gentleman and could give me no assistance. However, he permitted me to carry home some volumes which I returned next day.

Having dined at the Hague we took a voiture to Scheveling, a miserable fishing-village full of impudent poissardes and beggars, but it is one of the prettiest drives in the world, through a beautiful avenue of fine beeches and elm trees. Returned and slept at the Hague.

Tuesday, August 27th, 1822. Lost a long while in making enquiries of, and by means of, the uncommonly stupid and half brutish servants of our Inn about the Rotterdam Steam packet and getting false information at last. We visited the Gallery of pictures which is one of the finest collections in Europe. Walked in the park and rambled among the lovely avenues and wild winding walks of forest-trees which surrounded the Hague. The park is a mere square enclosure with a good many deer. It is a pity that the canals in the walks are green, stagnant and stinking.

Took Treckschuyt in afternoon to Leyden, Delft and Rotterdam.

At Leyden nothing remarkable.

Delft steeple will tumble down.

Rotterdam is an amphibious town of enormous magnitude. The houses are very handsome - the British Consul's is a Palace.

In evening went to secure places in the Steam Packet "Rapide". Opposite the "Bad-hous"! noticed a board with "Lust-hous te heuren"!! ("i.e. Lodging, or a country-house to let.")

August 28th. Remained at Rotterdam. The houses in this town (which are not quite modern) lean outwards in a way so preposterous as to be quite terrific. It is unpleasant to pass under them. What a perverted notion of beauty and propriety their builders must have had. The new houses and public buildings are however free from this absurdity but all the old part of the town looks as if still tottering from the shock of an earthquake.

August 29th. There is no Custom-house examination of luggage at leaving Rotterdam and passports need only be sent to be countersigned with a fee of 6d. cash.

We got ourselves and luggage on board the "Rapide" at 8, but the ship did not start till 10.7.

The wind S.S.W. exactly in our teeth and blowing a fresh breeze, this made Grahame and myself hold a consultation whether we should not disembark and go by Calais, but the disinclination one usually has to a change of measures once adopted, alone decided us to remain.

The engine is a 70 horse power and is what is called an atmospheric engine, in which the force is produced by atmospheric pressure only. The fuel consumed per hour is 14 cwt. and the quantity of water evaporated 2 tons (a sad disproportion it must be confessed).

By the time we had made a dozen miles, the Captain mentioned that the boiler had given way in the morning, at the bottom, just over the fire, and there being no time to repair it properly the hole was stuffed with pieces of wood, the non-combustibility of the wood, though in contact with the fiercest fire, being held to be sufficiently secured by the water above it, a slender reliance it must be confessed and which made us all rather uncomfortable when on reaching the open sea beyond Helvertslings we found the sea running mountains high and a gale blowing.

We were delayed some time at Helvort by the non-attendance of the Officer of Customs and at last set sail without the vessel being cleared. Perhaps this saved our lives, for it caused a waste of fuel and forced the Captain to return when half seas over ... etc. ..... "

Manuscript ends.

Ends.

crossed in the Thames. The voice of rumour came aboard: "Death of Sir William Herschel" and a number of letters awaited him referring to the same news. Abandoning Grahame and leaving Gibson to do the luggage he made a dash for home. His Diary curtly sums up the position in words, trenchant as a sabre cut: -

Aug:25. This day my Father died. [Evidently written in Later.]
(No entries in interim).
Aug:29. Sailed in rapid steam-packet for England (from Rotterdam). Reached Helvort in evening. Blew a storm the whole night. Wind in our teeth precisely.
Aug:30. Passed at sea. Wind still right in our teeth but more moderate began to fear exhaustion of fuel. At about midnight off Galloper lights.
Aug:31. Reached London. The first intelligence which met me before I set foot on shore was that of my dear Father's death. He died on the 25th. Posted immediately with Thomas Baldwin to my Mother. An awful meeting. Found Babbage and Mr. Beckwith at Slough.
(No entries in interim).
Sept:7. My Father's Funeral.
N.B. It was attended by Mr. Beckwith, Babbage, H. & G. Griesbach, T. Baldwin. Dr. Goodall (the Provost of Eton) Mr. Hayes. The Rev. J. Grover (Eton College) Mr. Slingsby (who performed the ceremony) Mr. South. (Vice Provost)
Sep:15. Went to Church with my Mother and Aunt. Received the Sacrament.
Sep:23. Called on Count Munster and delivered to him (as Chancellor of the Guelphic Order) my Father's Cross according to the printed directions prescribed."

The descendants of Sir William Herschel visualize the situations now arising by scanning certain small sheaves of paper laid aside by his widow[2] and others.

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[1] Other letters had unfortunately already been dispatched "poste restante" to Calais [See Letter to Postmaster, Calais - from J.F.W.H. Sept.12th 1822, asking for their return: "Under the seal I enclose a half-sovereign which I suppose will more than cover the expense of postage".]

[2] The papers included:
(1) Copy of instructions to the Undertaker for the interment of her dear husband. There were to be: Four Mourning Coaches. The Deceased's Carriage will convey Mr. Champneys to Church and returning fall in behind the last coach. The ceremony ended, the gentlemen invited will partake of a Collation at the Crown. Dinner for Attendants. Hatbands and gloves. To make out and send a list of addresses for intimations to mourners including Baron Best, Representative of Hannover."
(2) Rough draft of a letter to some one at Court which will inform His Majesty of the death of Sir William Herschel. It is in Babbage's sprawling hand and requests

(Continued on next page).

It appears that public interest stirred sufficiently for even William Cobbett in his fiery periodical "John Bull" to find room for the entry: "Died on Sunday 25th ult: aged 84, Sir William Herschel, the celebrated astronomer." Of course obituary notices appeared in all the principal daily papers. There came letters of condolence[1] more or less formal, to be acknowledged from numberless correspondents. Consultations must be held with Provost Goodall who composed the Latin epitaph and with Chantry who designed[2] the simple marble tablet for this inscription. But the greatest upheaval of all concerned Caroline Herschel. She decided in a flash at the deathbed of William Herschel to return to her own birth place and make

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(Continuation of Footnote on previous page):-

an acknowledgment to his town address whilst in Lady Herschel's writing it is neatly endorsed "Peel". (Note- Sir R. Peel was Home Secretary, 1822.)

[1] Letters of condolence from Miss Maria Edgworth, Sir Humphrey Davy ~~(1)~~ received Pictet & David Brewster and of course from Whewell & Peacock both far away at the time. In this connection, J.F.W.H. received a letter from Sir James South written about 40 years later, recollecting in somewhat maudlin vein the incidents of the day. He states: "To the Grave I followed what of him was Mortal and the last tears shed over his remains fell from my weeping eyes when all his other Mourning Friends had quitted Him." His feeling were genuine for referring to a bygone custom he says: "The Mourning Ring I have in memory of your Grandfather is the only Mourning Ring I ever wore in my life." Sir H. Davy also refers to this custom.

[2] Sir W. Herschel's tomb is in St.Laurence Upton, under the centre of the tower. Chantry undertook the design for a mural tablet. It originally faced the congregation immediately above the pulpit in the nave, but since the parishioners restored their ruinous Church it appears on the south wall of the tower. It is inscribed with an immensely long Latin epitaph by Dr. Goodall. Ten years later the younger Herschel "thought it right to alter the inscription on his monument" by adding to his father's achievements lines referring to double-stars.
Miss Mary Russell Mitford saw Upton Church (round about 1840) with the roof fallen in and the rain pattering down inside its walls. The structure was about to be pulled down for the value of the building materials, but Farmer Pocock could not bear the thought and paid £50 to prevent it. A public appeal was issued resulting in the present building.

her home in Hanover with her brother Diedrich and his wife for the remainder of her days. As events turned out she lived in Hanover respected and revered by a large circle of relatives and friends till her death in 1847.

With her usual stoicism she kept to herself the bitterness of her grief. Her sheet anchor at Slough had parted, she feared to burden her sister-in-law, moreover her only personal friend Madame Beckedorff had already returned to Hanover on the death of Queen Charlotte. Her decision seemed obvious.

Like her brother, William, she was "uncommonly precipitate" for within two months of his death she had cleared up all her papers, packed up her belongings, taken leave of Princess Augusta at Windsor also of Princess Matilda at Blackheath(who graciously sent her own carriage to fetch her) said farewell to all her young philosophers in London, parted with her few acquaintances in Slough and was actually seated at Rotterdam in a very good Inn writing to her sister-in-law in England:

Dear Lady Herschel, Rotterdam Monday Oct.21, 1822.
At this present moment I have nothing to wish for besides of convincing myself by one look of yours and my dear Nephew's health and composure; for after a very troublesome passage of 48 hours we find ourselves almost restored to our former condition with only the difference that we have no more hunting after our trunks from Custum house to Custum-house and can proceed on our way to Hannover in peace after one night's rest here in a very good Inn. But the last night was truly dismal for the selers (sic) themselves confessed that it was what is colled (sic) a high Sea, at one time a spray conve'd (sic) a bucked (sic) full of watter (sic) into my bed, which was regarded as nothing in comparison to the evils with which I was surrounded. I was the most seek (sic) of all on board and the poor old Lady[x'] was pittied (sic) by all who inquired after her, but I had four (sic) Ladies in the same Cabin with me who encouraged me to hold out which at one time I thought it would have been impossible. Something happened to the vessel for want of a good Pilot in the Thames and at Blackwall we laid still 5 hours then we hobled (sic) on to near Gravesend, and there laid in a high sea at Ancor (sic) all night whilst they were patching and t'umping (sic) to make the vesel (sic) we were to go in.

x' Caroline Herschel was then 72.

In consequence of this we could not reach the spot where a Pilot could meet us time enough on Sunday evening and lay again for Ancor. At half-past 11 I set foot on shore where so many people were assembled to gaz (sic) on us that it sett (sic) me a-crying and now I am glad to be shut up once more in a room by myself and where I can make proper preparation for traveling farther which hitherto I have not had the opportunity of doing. All my dress which I had prepared for the ship or sleeping on the road were locked up at the Custum (sic) house and I could not get hold of them again till we entered this house .... Millions of Compts. and thanks to yourself and our nephew who took last Friday so long a walk to see us once more, my fears for what was to come and regrett (sic) of what I left behind was so stupifying that it made me almost insensible to all what was passing about me .... only this I shall remember with satisfaction that his looks were better than I have see (sic) for a long time past. .....

Ever your affectionate Car. Herschel.

A week later she arrived utterly exhausted in Hanover with her brother Diedrich who very properly had journeyed to London on purpose to fetch her.

The passage in those days is a formidable undertaking even for a younger woman but soon it was all forgotten:

My dear Lady Herschel Hannover (sic) Nov.12, 1822.
... you will have seen what a disagreeable passage we had at Sea, but all those frights and fears and the troubles and the fatigues of the journey .. appears now to have been nothing but a dream and my waking thoughts are for ever wendering back to the scenes of sorrows which embittered the afflicting and final parting from my revered Brother .... but it is hard to live for months without knowing what may have happened to those one has been for so many years immediately connected and in the habit of keeping up a daily intercourse. I have hitherto been unable to overcome a dislike to going abroad and what little I have seen of Hannover I do not like! ... But a total seclusion from society will not do for a continuance. ... (Nov.27th). ... I would not conclude nor send of (sic) my letter till I should have received some satisfactory account of your well-being and the arrival of the last post has given a most agreeable turn to the dismal impression the parting scenes of the 17th & 18th of October had left on my mind.

P.S. My dear Nephew, I want very much to send you some of the Philosophical productions in which (my nephew

Groskopf says) this country abounds. I wish you would let me know if any of the works of Schelling are known in England? ...
(x' His name & title is in the English Court Callender (sic)).

A month later she began to settle in:

Hannover Dec.18th 1822.

My dear Lady Herschel,

At last I am able to inform you of the safe arrival of my boxes & Trunks ... for the Vesel (sic) had been no less than 3 weeks at sea and then had been obliged to unload 6 German miles beyond Bremen for want of water in the Weser. The Country is in general much distressed for want of water our large rivers may be passed on foot etc. ... As yet I lead but a dull sort of life, the Town is much too gay for me. Plays, Concerts, Cart (sic) parties, Walking etc. I cannot take part in any my cold in my head is still very bad and my poor Brother is frequently unwell and for want of my Trunks I could not accept Mrs. Beckedorf's infitations (sic) to meet Madam Zimerman etc. in an evening on account of not having clean things but she is so kind as to call on me sometimes among all the hurry she is engaged in at present with the Princess Augusta.

Your very affectionate Car. Herschel.

P.S. We have had a few days very severe frost. Tomorrow I shall unpack my Thermometer. ... The price of fewel (sic) is enormous owing to the Frensch having destroyed all the Forests."

At last the Philosophical books start safely for Slough by the kindness of Mr. Goltermann, London Agent for the Hanoverian Court. And her rooms begin to feel like home:

Hannover Dec.26. 1822.

"My dear Nephew

The parcel I am packing up ... I have desired Mr. Goltermann to keep till called-for, as perhaps you you might about that time be in Town and occasion double carriage. ... of the Philosophical work I will say nothing farther than that I am curious to know if I have sent you Sense or non-Sense (sic), that I may know in future how to trust my informer. ... It is a poor account I can give of myself at present and the worst of it is I cannot hope for better times. I am still unsettled and cannot get my books and papers in any order till the dinner hour (which is 2 o'clock). Two or three evenings in each week are spoiled by company. And at the heavens is no getting at for the high roofs of the opposite houses. But within my room I am determined nothing shall be wanting what can please my eye."

"The handsomest rooms 3 or 4 times as larger than what I have been used to from which I can step in to Mrs. Herschel's apartments have been prepared for me and furnished in the most elegant style."

"Exactly facing (sic) me is a book-case placed on a bowrow (sic) to which I will have some glass doors made so that I can see my books (here a sketch). Opposite all this on a Sppha I am seated, with a Sopha table and my new writing desk before me, but what good I shall do there, the future must tell."[x']

In spite of these gloomy fears she thoroughly enjoyed herself at that desk for the next two years in the execution of a Zone Catalogue of Nebulae. She sent this finished Catalogue "along with the eight Volumes (of William's Sweeps) from which they have been drawn out" to her nephew as a birthday present in 1825.[x'][z'] By that date John Herschel vastly appreciated this labour of love[a'] for at last she had really engaged his attention and his reply fully satisfied her affectionate soul. When first she left England, six months had dragged past before he even alluded to her gap in the Slough home circle, yet the sorrowful old lady, panting for sympathy, snatched at his few words then like a cup of water in the desert. See her next letter:

Hannover Feb.27. 1823.

My dearest Nephew ...

.... One passage in your letter affected me much, it was gratifying to me and unexpected ... (You say) 'but now that you (Aunt Car.) have left the scene of your labours you have the satisfaction of knowing that they are duly appreciated by those you leave behind.' But I can hardly hope that these favourable impressions should be lasting or rather not be effaced by my hasty departure, but believe

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(x' ~~footnote~~: "As I wished to avoid the sending backwards & forwards by blundering coachmen.")

x' Brewster's Edin: Journal July/25.
"Miss C.H. has occupied herself since her residence in Hanover in revising the 20-ft. sweeps of her brother. This is a work of immense labour and will be an extraordinary monument of the unextinguished ardour of a lady of 75 in the cause of abstract science." It consisted of 10 folio volumes

z' (a) For this she received in 1828 the Gold Medal of the Astronomical Soc: The Editor of W.H's Papers (Dr. Dreyer) says "It is to be regretted that C.H's Cat: was not at once given to the public since the publication of the separate results of her brother's observations would have prevented the continuance of many an error." Sir John never published it because he always intended to bring out a General Catalogue ... which he did not complete till 1864."
(b) J.F.W.H. to Brewster, Nov.28. 1825. Respecting Miss H's Cat: of Neb: ... there are plenty of Cat:'s of Stars but one of Nebulae is still a desideratum in Astronomy.

me I would not have gone without at least having made the offer of my service for some time longer to you my dear Nephew; had I not felt that it would be in vain to struggle any longer against age and infirmity ... I hope you and Lady H. have not suffered by the severity of the weather, me, it has certainly done no good, I am grown much thinner than I was 6 months ago, when I look at my hands they put me so in mind of what your dear Father's were when I saw them tremble under my eyes as we latterly played at backgammon together. ...

I remain ever Your affectionate Aunt.

C. Herschel."

Time is passing on. His contemporaries want to read William Herschel's writings for themselves. This she was quick to notice in her next letter.

"April 14. 1823. Hannover.

"My dearest Nephew, ...

.... The Germans are very busy about the Fame of your dear Father and Dr. Grosskopff (sic) saw in 'den gelehrten Zeitungen' that Professor Pfaff has translated all your Father's papers from the Phil: Trans: into German.[x]

P.S. Twice a week a letter may be left for me at Mr. Golterman who, as a favor encloses the same in the King's packet. - "

When replying John explains that the Double Stars Catalogue he is working at with James South[x1] is preventing him from himself republishing his father's works but Pfaff is "a respectable mathematician" and he hopes he will carry it out.

In letters of condolence, David Brewster from Edinburgh, and Professor Pictet from Geneva added their earnest appeals that John Herschel should publish a life of his father and re-edit his works. This he certainly wished to do, in fact he told Brewster that he had set about a Life but felt he was being led further than he intended and should reserve it for publication with the collected papers but it became abundantly clear that no publisher would venture money on a new edition of William Herschel's writings. On this point John Herschel wrote in 1866 to a friend: "I resigned the idea of hoping I might do something in perpetuation of his fame... by devoting myself to extending and carrying out his processes of observation." Much, in spite of his now advanced age(74)he adds with boyish enthusiasm: "It would doubtless be no unworthy object...to devote my remaining years to the preliminary work which must be gone through by someone, ... a simple reprint would hardly satisfy me, nor could I communicate my views to any other person, a (novus homo) man of the present generation cannot place himself in the standpoint of the last 20 years of the past century so as to form any just estimate of the scientific disability under which generalization at [1750-1822] that epoch laboured in comparison with the present time ... neither Struve nor Arago quite satisfy me that they have fully seized the "enchaînement" of his speculative views on a variety of points."

Some years later he had occasion to correct a statement, prevailing abroad ever since 1802 under the signature of Baron Zach[x1] (a careless writer), that William Herschel's education was neglected. In point of fact, William Herschel's father, 'himself a well-informed and for his time an accomplished man, not only took the utmost pains in the instruction of his family himself but procured for them (at an expense he could ill afford) masters in various branches of polite accomplishments and knowledge."

No doubt a lifelong study of William Herschel's distinguishing qualities[x2] provided the framework for his Presidential Address in 1829. He assigned the Gold Medal of the Astronomical Society to the German astronomer Schumacher saying:

"Astronomy is a science peculiarly in unison with the German national character. The persevering industry which forms so striking a feature of it, is the quality of all others requisite for an astronomer, that diligence which never wearies, and which working slowly and destroying nothing that is done, goes on adding grain by grain to the mass of results and accumulating them with a kind of avarice to swell the heap; that painstaking scrutiny which penetrates through all details and will not be satisfied till perfection is attained. And on the other hand an enthusiasm seemingly incomparable with this plodding turn, yet often coexisting with it in the same mind, a love of systems for their own sake, a spirit of speculation sometimes bordering on wildness and an ardent and inherent love of the vast and wonderful. Among minds of this turn it is no wonder that astronomy should flourish - with enough of sublimity and mystery to exhaust the wildest imagination and enough of laborious detail to keep in employment the most patient industry."

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x[2] Op.44 - published 1824.

x[1] J.W.A. Pfaff 1774-1835. Prof Math: Erlangen. See later p. Grand Tour. See CLH & JFWH Dec 5. 1826

x[1] Monatliche Correspondenz 1802

x[2] Letter from JFWH to Bessel. "You have undoubtedly seized on the true features of his (W.H.) character viz. Earnestness in the direction of his entire faculties to the accomplishment of his one and only object, that of seeing as much as can be seen and understanding as much as can be understood of the celestial bodies. Perseverance in his efforts towards that end and unwearying industry" (June 5/1843)

John Herschel's diary does not allude again to his loss. Happy relations between himself and his father in the past are obvious in his reply to a friendly and discerning letter by his usually jolly companion, the Rev. Richard Jones:x

"Sept.11th 1822. 9 Downing Street.
..... The loss I have sustained comes more sensibly home to me than even at first, for it requires time to miss and feel the want of an affection like the Father's I have lost, an affection, it is true, that never broke forth in transports and caresses or manifested itself in unreasonable indulgence, but glowed with an equal unchangeable warmth from day to day and from year to year and never for a moment ceased to be the actuating principle of his soul. The world has nothing to offer in compensation for a love like this ...."

At the Royal Society, recipient of all William Herschel's published thoughts, the President in his "Annual Address"on the characters of some deceased Fellows" might well utter the following statements (inter alia) in the grandiloquent manner of the day: "His name will probably live as long as the inhabitants of this earth are permitted to view the solar system .... He had little left to wish for except that expansion of intellect which can only belong to the mind in a higher state of existence .... When age no longer permitted him to make discoveries he saw his son taking his place and distinguishing himself in the same career." Finally, Sir Humphrey Davy declared to the assembled Fellows: "No name in modern times has more contributed to your glory."

x' See "Herschel Chronicle" p.361. for letter from Rev. Richard Jones.

William Herschel lived to see his son taking his father's place in the astronomical world. What is more to our point, the younger Herschel carved out his own niche thanks to his scientific training and freedom from money cares. Temperamentally, no party-man, his courteous pen stated unreservedly his personal opinion when consulted on any subject. He did his best work as a free-lance even though from 1820 till 1855 he held official positions linking him with foreign Societies and English institutions whose engagements perforce gave outline to his days. All the time his individual taste lay elsewhere for that "truant disposition" of his fought a life-long struggle against somnolent office-holding. His real campaign lay in sporadic attacks on "the seven terrestrial sciences", or most of them. Taking the whole of "philosophy" as his province he pursued his own thoughts serenely happy at any time. His novel methods of instruction delighted his readers. e.g. In his Text-book for the Royal Navy to illustrate "lateral" mirage he cites a vivid personal experience: "I remember, when walking on a hot sunny day under the south wall[x1] of Kensington Gardens, the sun shining full on it, I observed the distinct reflection of persons walking on the same footway. A single soldier, for instance, appeared as two; the shape and colour of the uniform being visible in the reflected image on the wall, which appeared invested with a glassy mirror-like coating." And he gives liveliness to another subject in that same book: "A Water-spout". He writes the word. He glances out of window, Behold! by a notable coincidence, a water-spout before his very eyes. He adds a topical remark and dates it "Aug.5th 1849". In fact, his great power of apperception developed until it came about that a contemporary wrote: "Herschel's name is a household word" and another spoke of "the long-sighted vision of Herschel". At a considerably later date a son-in-law remembered the lighthearted expression: "When in doubt, consult Herschel".

The death of his father entirely altered John Herschel's outlook. "None goes so far as he who knows not whither he is going", (for such an one has no definite goal in view)

Preoccupation by work with his father ceased. The future becomes the present. The many visions just ahead of him, e.g. travelling in Europe to meet "savants" in their own observatories; a visit to South Africa to complete his Father's great Star Catalogue;

x1 This enclosing wall built by George I was replaced by the present iron railings in 1828. See Mrs. Tweedie "Hyde Park, its History".

tackling of his own leisure scientific questions still unanswered. These shall at length be carried out. Whilst through it all threads the vision of settling down beside a wife [illegible] surrounded by a happy family of children.

At first practical astronomy with South compelled him to spend nights in the open air on all observing dates either at Blackman Street or at Slough (with his own excellent 5-ft. reflector) till at length his enthusiastic old Aunt in Hanover receives his news: "I hope very soon to transmit to you" writes he "our work on the Double Stars"[x1] in which you will find some of my Father's most interesting discoveries placed beyond the reach of doubt[x2]." and he gayly remarked that he proposed to keep special watch over Nebulae: "no one else can see them", for the simple reason that his beloved newly-conditioned 20-ft. was the largest reflector then in existence. He says in his Diary: 1822. Sep.18th: "Today completed the 20-ft. reflector and saw the bright patch in the Milky Way in Antinous resolved into Stars. The resolution is complete. The stars thick-sewn like gold-dust strewed on a black ground but not running into each other. No trace of nebulous light between them. A truly magnificent sight."

In the intervening daylight hours he found leisure to write a couple of manographs on the Fixed Stars[x3][x4] to produce the exhaustive work "A History of Physical Astronomy"[x4a]. Simultaneously with many another scientist he was bitten by the impulse to experiment amongst a group of mysteries, including magnetism also the so-called "electric fluid", and fading away into mesmerism and the like. Accordingly being invited to deliver the Bakerian Lecture before the Royal Society in 1824, he there develops enquiries into the "singular convulsive agitation" of electrified mercury[x5] This was his first of various papers and Reviews touching on such matters for he kept a lifelong watch on their ever-increasing importance in both scientific & commercial progress.

and to lecture on Navigation of Light at the Royal Institution.

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x1 For this work they were each awarded the Gold Medal of the Astron: Soc: 1826.

x1 J.F.W.H. to C.L.H. "You will be gratified to hear that the French Acc: de Sc: have thought so well of this work as to give us the prize of Astronomy for the present year (a large and very handsome Gold Medal to each of us.) Our competitors it is whispered were Bessel, Struve & Pons. [See I. Graham to S.W.H. June 4./25.- Joyn you joy of your Prize what did the Monsieurs give you?..]

x2 Op.44. Phil-Trans:

x3 Ops.38 & 41.

x4 Op.39. Translated into - languages. A popular educator until 1880—.

x5 "On certain points produced in fluid conductors when transmitting the electric current." Op.42

How he tackled his visions appears in letters to his friends and in his letters to Hanover filed away with such pride and care by Caroline Herschel. To her he wrote "I see you are after all one of the discoverers (and probably the earliest) of "Encke's Comet". It is your comet of 1795. I daresay you little thought at the time of its ever being seen again."

(Perhaps if the principles of "Women's Rights" had been earlier recognized the Comet would bear another name?)

He mentioned to her that he wished to keep attention directed to large reflectors[x1] and is therefore sending to the Astr: Soc: "Observations taken with a 20-ft. Telescope." These became a series of Catalogues, the last appearing in 1870, nearly 50 years later!

He certainly inherited a large store of his father's tenacity of purpose.

He apologized to his aunt for not writing. Astronomy absorbed him. "I have little time for anything else, reductions of double-stars, looking over Journals, Reviews etc., for information on what has already been done, recasting my Father's measures, swallows up a great deal of time and labour."

Mainly through these Catalogues John Herschel soon became "pre-eminent"[x2] in the Astronomical Society where his introduction of measurements by micrometer for position angles made quite a stir. "Some Members of the Council seem to have been alarmed by this innovation"[x2] and desired no change but, as South was deputed to talk it over with the daring young man, naturally it became "the notation ever since adopted"[x2] A Catalogue extracted from these "sweeps" and printed in Phil: Trans: by the Royal Society in 1833 included at least 500 Nebulae or Clusters recorded for the first time. 6-8 Discovered by John Herschel.

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x1 To Fourier, May 9th, 1825. "The advantages of Reflecting over Refracting Telescopes are (1) A much smaller and more distinct image of the stars (aperture for aperture). This curious fact has never to my knowledge been especially noticed hitherto. (2) Greater convenience in the position of the observer. It is this alone which renders it practicable to sweep the heavens for many hours together without withdrawing the eye from the telescope. (3) A greater degree of stability and the very best mechanism ... After all (defects here mentioned) I prefer the best reflectors to the best refractors of equal light."

x2 Extracted from History of the R.A.S.

re Pond

"When a man finds his own views of the object and duties of a public office differ from those of his employer (the public) he ought to resign, but supposing he does not, it becomes a question of policy or convenience whether the point should be pressed against his will?... Responsibility in character is the leading hold the public have on him ... There are dispositions so weak that persuasion is to them force. To persuade them against their will is indelicate." (from Vol II p18 of my scraps-books)

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Pond.

A dark scheme, quite in tune with the perverted manners of the day and quite contrary to Herschel's sense of probity, was also in the hatching about the appointment of a Chief Assistant. He wrote indignantly to South that he had no idea of shoe-horning the person mentioned by South into an Assistant's post at Greenwich by announcing himself as a candidate for the high office of A.R. He declined to have his name in the remotest degree linked with that of a "scoundrel". He agreed that he is speaking plainly because "in delicate situations the narrow line of salvation ... meanwhile it only rests with the President (R.S.) to see the affair put on its right footing .... I think the office of Astronomer Royal a fair and honourable object of ambition (I flatter myself too that neither my friends nor the public will now require me to publish a list of qualifications). It is a distinction I should covet with earnestness but .... neither the fair fame nor the profit it offers would ever weigh with me to suffer my name to be mixed up with a business which if pressed one step further, will merit the only name I shall then have to bestow on it that of an infamous job" .... "I am sure you know me better than to suppose me capable of lending myself for an instant to any arrangement of the kind. I would see .... (him d——d) ... first." In fact John Herschel is beginning to feel his feet for when five years earlier, just before their little jaunt to Paris Babbage advised him to try for this office, at that date his

officers would, being totally unqualified for a position of such prominent importance ... you know very well what a novice I am in observations with fixed instruments."

No first call obtrudes now on John's time, his days are his own. Work on his history of "Physical Astronomy" for the Encyclopedia Metropolitana and his preparatory experiments for the coming Bakerian Lecture require constant excursions to London. He raced up to town more than twenty times within a year. The certainty of meeting there sooner or later every philosopher from the continent gave zest and hope to the boredom and stuffiness of these coach journeys besides, as Foreign Secretary of the Astronomical Society his duties are also his pleasures. For example "a very sociable agreeable and interesting man with [illegible] delighted" namely Oersted, nibit Seebeck's "thermo- and bismuth". Herschel up the river and later bey. On another occasion Herschel's rooms: "Dis- y of the polarization of by a visit to the New Gasometers![x1] He also ough to make "experiments

set suited him well for ter Stairs. A waterman ither to Waterloo pier tairs for the City stage- ory, or on as far as Greenwich ould also sail or be rowed for relatives at Brompton ter he occasionally sent by broad-wheel waggons to

re in London his Diary soon otably by an invitation Lectures on polarization ion. He laid the founda- s, when he met at dinners owd of the men of note, their names appear in his Diary: Captain Franklin the Arctic explorer, Chantry the sculptor, David Wilkie the painter;[x3] Dr. Young, Secretary of the Board of Longitude,

x1 Oersted

See Presd[t] Adress Sir H. Davy. 1824. "till the discovery of M. Oersted the true relation of magnetism & electricity were unknown."

[x2] Pepys wanted him to take Shares. Declined. He did not wish to be the "scientific Director" nor did he wish to be responsible for a large sum in a new undertaking.

[x3] See D. Wilkie's reply to J.F.W.H. (who asked him to recommend a miniature painter) "For that elegance & tact indispensible in the portrait of a lady, combined with a good likeness, I know none equal to (Alfred) Chaloner. A portrait I have lately seen of Lady Blessington I thought an excellent specimen of this artist's ability."

No wonder he forms the impression;"Friends tell me I could have the Astronomer Royalship if I liked to apply for it." But he gave reasons for not doing so. A tremendous upheaval at the Royal Observatory is disturbing the peace of mind of the Admiralty and the Visitors. This earthquake trembled round the affairs of the invalid Pond and of his appointments of Assistants. According to Herschel "The character of the present A.R. (I write this in the confidence of friendship) is one of such amiable, but still quite infantine, simplicity as lays him open at every point. He is confessedly incapable or unwilling to nominate right persons (as Assistants)." Pond is old-fashioned and chooses his Assistants as he would his servants but he carries out his work and duties satisfactorily. To discharge poor Pond now because his manner of producing the work does not please would be, in their Lordships' turn, to treat him as a menial servant of the Public. The principle has been agreed upon of appointing Assistants of liberal education, men of character and conduct, in whom the A.R. could place complete confidence and with handsome salaries so why not wait till Pond goes and then make a clean sweep at the Royal Observatory? This is in fact what Airy did in 1835 on the retirement of the aged Pond.

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His rooms at 9 Downing Street suited him well for all water-traffic from Westminster Stairs. A waterman could pull him down the river either to Waterloo pier for the Strand or to Old Swan Stairs for the City stage-coach offices for South's Observatory or on as far as Greenwich to the Royal Observatory. He could also sail or be rowed up-stream to Chelsea quite handy for relatives at Brompton or even Kensington. And by water he occasionally sent heavy goods to Windsor, thence by broad-wheel waggons to Slough.

Provided with a pied à terre in London his Diary soon fills up with engagements, notably by an invitation from Pepys "to give two Honorary Lectures on polarization of light" at the Royal Institution. He laid the foundations of life-long acquaintances when he met at dinners and evening parties a varied crowd of the men of note, their names appear in his Diary: Captain Franklin the Arctic explorer, Chantry the sculptor, David Wilkie the painter,[x2] Dr. Young, Secretary of the Board of Longitude,

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Sir Humphrey Davy, Dr. Baillie (the late King's Physician and his own) & Alexander D'Arblay once more. Major Colby at the Tower, South in Southwark, Alfred Gautier, Kater, Oersted, Wollaston, "Pye, a young Maudlin (sic) man, son of the Poet Laureate", Wheatstone, Barlow and Perkins [the inventor of a machine-gun worked by steam! "It fires 240 shots a minute, I saw it fire 25 balls in 5 seconds = 300 a minute".]

Lord Melville (Sec: Admiralty) gave the Annual Board of Longitude Dinner. Covers were laid for 18. Besides Herschel the guests included "Lord Stowell, (a little elderly plain man in no way remarkable) Lord Colchester (Abbott, the Speaker ci-devant animus in augusto corpore, quick, but (query) if clever?) Sir G. Cockburn[x1] (whom I got next to, an agreeable conversable man professional in his subjects but not in manner). Lady Melville (drew out Dr. Young and Davy on scientific points - rather blue unless assumed for her company - affects to speak boldly on all points, uses vulgarisms - mais elle faisait l'agreable.) ...Rigaud[x2] (rather a jolly person and professes general information)". etc.

At the Audit Dinner given by Sir H. Davy "more good things were eaten than said". But four days later Herschel culled one sentence from Sir Humphrey's speech to Pond (Copley Medallist) "As the sphere of light enlarges, the boundary of darkness enlarges with it." For the R.S. Anniversary Dinner Herschel sat "between Babbage and Kater with Chantry. After dinner Sir T. Lawrence spoke - middling- Davy's speech on the connection of sciences - admirable. His general views superb and full of excellent good sense. Reaction of mind on mind the principle. Mr. Peel[x3] made a very fair speech in which he alluded in a good manly way to his Father's rise in the world, by machinery and therefore by science."

On other nights he dined in the Towsrof London with Captain Colby (in charge of the Ordnance Survey then in progress) or up at Hampstead "attending on" his Mother to the poetess Miss Joanna Baillie. He looked in at one of Babbage's soirées and at Southwark dined with the Souths, sometimes observing with those instruments till 3 or 4 next morning. On one occasion, meeting there Troughton the instrument-maker, they tested his sight knowing him to be colour-blind.[x1] At a dinner with Wollaston his host explained his thrilling novelty, his "method of making a platinum tube without soldering". All the year he regularly attended the Astronomical Society Meetings and Meetings of the Council of the Royal Society. At the same time the unsatisfactory condition of the Board of Longitude and of affairs at Greenwich Observatory continued to revolve darkly and deeply in his mind. He sat at their Board Meetings fuming in silence for another 4 or 5 years before he published his thoughts. In a long walk and talk Sir H. Davy, being aware of revolutionary plans revealed his appreciation of Herschel's forthright sincerity by discussing in detail with him whilst they paced along, his new plans for dealing with the Observatory question. And so the days went by, but the fetid air of London never did suit Herschel in too large a dose. He soon took a breather to Brighton to see the newly-erected Chain Pier examining it closely and measuring essential features![x2] Then the re-publication of his Father's writings being still fresh in his mind, he ran down to Cambridge having bethought himself to "make application to the Syndics of the Univ: Press to reprint my father's work." Naturally, once there he looked up all his Cambridge friends and dined with them in turn.

Whewell's "massive virility" and omniscience is already apparent. Peacock, delighted with the success of his Observatory scheme must needs walk Herschel out to Madingly to deliberate over the installation of the instruments;[x3] and took him round to Prof: Cummings "to see electricity or antimony developed by heat". Prof: Vince showed him "the plans for the new buildings at King's". And so at Cambridge he celebrated; as he says: "My 31st birthday". He called on Lady Harwood,

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x1 Admiral Sir George Cockburn (1772-1853) Junior Lord of the Admiralty, F.R.S., M.P. "He was regarded by the Duke of Wellington as the first man in the Navy. He never grappled with a question he did not understand. He took Napoleon to St.Helena, remaining as Governor for one year." Gentleman's Mag: 1853.

x2 S. P. Rigaud. Member Board of Longitude.

x3 Better known as Sir Robert Peel (17- & 1850) Home Secretary.

x1 (See Op 58. Light para: 107) Troughton had lost the sight also of one eye.

x2 See 1826 Journey. Sep 30th 1826 at Tain on the Rhone.

x3 Peacock to J.F.W.H. Mar. 1823: "I should wish Troughton to be present when the foundations of the piers are laid ... I had understood that our very philosophical Chancellor (H.R.H. of Sussex) was anxious to be present ... It would add to the interest of the occasion if Troughton was obliged to listen to (and answer) H.R.H's questions .. through his trumpet, it would indeed furnish a very fine scene!" (T. was very deaf!) "I wish very much that you would attack the old gentleman about our Circle, he lies so unremittingly that there is no trusting to his promises, but something may be done by perpetual teasing."

the widow of the Prof: of Anatomy.[x'] (Later he induced her to come down to Slough for some reason not revealed.)

Lady Herschel being possessed of a great talent for social gatherings certainly did her best to surround her only child with a happy home life whenever he was at Slough. There is always a welcome for Babbage or Jones or James Grahame, besides whom, Mrs. Somerville came to stay. So did Lady Harwood! With her son acting as host she gave dinner-parties to their Eton & Windsor friends, the Provost and Mrs. Goodall, Captain and Mrs. Copeland, Mr. Rham etc. She urged him to go into society as much as possible and from one musical party he brought home a fine story. "Mrs. B. related having travelled about the environs of Bristol many miles in a carriage drawn by 3 Kites! It contained 9 persons and went at the rate of 10 miles an hour. It was constructed by Mr. Pocock, schoolmaster at Bristol. The Kites are of Silver paper and their frames are jointed and fold up. She assured us that he can go and return by the same road. He once travelled 150 miles from Bristol to Wales in it."

Odd things happened on the roads in those days. Herschel noted as he was riding over to Cippenham: "Saw a woman and child of 4 walking 30 miles in 8 hours - (Presumably for a wager) - Endeavoured to stop such cruelty but prevented by the breaking loose of my horse."

There came also to Slough miscellaneous visitors to see the Great Telescope (the Wonder of the World). Amongst the 'mixed bag' he had to show round are the names of: Montgolfier, the balloonist, who brought 2 young nephews to stare at it, H.S.H. Prince von Lippe, "An Artist", "A foolish foreigner!"

Naturally, when at home, he "attended" his Mother to the Ascot Races and Races at Egham and as for the State Entry of King George IV into Windsor no lady could see that without "attendance". They probably drove but unless they had some card to pass them in to the Castle it involved a very early start through disorderly crowds of country-folk thronging the steep streets of Windsor. When next day the King gave a Public Dinner to 2500 poor people in Windsor Market Place, Lady Herschel simply could not face it. She lent her son to attend a certain Mrs. Delavaux[x²] to this struggle, remaining quietly at home by herself for she was dining out that night.

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x' Sir Busick Harwood, M.D. See amusing episode in H. Gunning's "Reminiscences of Cambridge".

x² Probably a fine sample of Mrs John Bull. Grahame refers to the benevolent bluster of Mrs Delavaux."

He broke the winter months by a December visit into Wiltshire where his descriptions of the land entirely bear out Cobbett's stream of criticisms. The diary says: "Reached Boyton, the seat of Mr. Lambert[x'], through lanes up to the axles in water![x²] A fine old mansion house with 2000 hereditary acres of good for nothing land about it and the tallest broad-cut Yew-hedge and the most extraordinary rookery I ever beheld. It is said there are 1,000,000 rooks. I am sure I saw 10,000 on the wing at once. Dined with Davy & South. South got half-drunk & became (as usual with him in that state) confoundedly loquacious and pretty general in his abuse of all men and all things. Bored Davy and me to death with Astronomy ... Next day set forth shooting in Lambert's woods. Saw and shot at 4 woodcocks, many rabbits, hares, and pheasants. At last harried up the preserves and had the devil to pay among the pheasants." A tenant farmer shot with him and dined afterwards. Next day he drove back to Amesbury and had a shoot there. "Stonehenge ... Situation just where two roads fork, one to Deptford Inn and Fonthill[x³] and the other to Bath. N.B. One of the incumbent stones is certainly squared by a tool, by hewing. A single stone 1/4 diameter of the Circle to the North. What is this?"

Whether in town or at home full pressure all the year through was the order of his days driving at work for the Bakerian Lecture for the R.S., and "Physical Astronomy" for the Encyclopedia Metropolitana, besides writing up the results of those night-observations with South, yet mundane affairs must needs creep in.

Being now a man with property in Slough: "Attended Court Baron at the "Crown" for Manor of Upton and took up copyholds in Upton", reminding himself that when receiving rents in guineas you return the odd silver! But a more vexatious affair cropped up. His present plan of living without rule or method in two houses at once brought its

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x' Probably the property of Bourke Lambert, 1761-1842, the botanist who, it appears, was not in residence. He had a herbarium at Boyton.

x² A very rainy autumn. "Eton is under water. Flood came on during the night. It runs over road by Fifteen-arch Bridge in full current." J.F.W.H.

x³ Fonthill Abbey, seat of Beckford author of Vathek.

X' A few months later in Italy ~~from~~ Herschel ~~abducts Grahame~~ a "tu quoque", ~~at Grahame who was mistakenly a second time~~ ~~elopes out~~ ~~expostulating on the affection~~ ~~his return from Italy when he first wrote deporting his sorrow~~ his return on the ingredients essential to a happy married life began pragmatically. "From what I have now seen of matrimonials".... A man has no right to marry a woman unless he loves her very much .. Your character is too warm & your views of all things too energetic. You will run a fearful chance of committing a real irreparable injury to satisfy a point of very doubtful honour." In fact ~~he expounds this point that~~ ~~that quite knight~~ "When in doubt do nothing." ~~It was~~ he was now acting on it himself. ~~evidently~~ ~~acted~~ acted on his own advice.

(p 204

p.204.

obvious results relying, as he needs must, on the honesty of a valet who accompanied his master in his vagaries. He writes: "Discovered that Carter had robbed me of a considerable sum by means of false keys (£170.)" with the help of his wife and then decamped. The story becomes a real thriller. The police traced him: "Carter apprehended in Dublin". James South traced certain of the stolen notes to Liverpool. (At any rate, Herschel did know those numbers!) Herschel writes (describing Carter) to Liverpool "Carter re-examined and sworn to by a person to whom he passed a note. Finally committed to take his trial at Aylesbury." Having obtained legal opinion that "Carter would not suffer death if proper means be taken to recommend him to mercy "Herschel decides to attend the Assizes, Supported by Captain Copeland; "set off at 5.30 a.m. from Slough - Aylesbury 9 a.m. Went to Church. Then into Court .... Carter's trial came on. Lasted 4 hours being unnecessarily drawn out. Verdict 'Guilty'." (Later tradition reports that Carter was transported).

However. the long and the short of this is that Carter and his verdict is all swamped by the next incident.

The Diary is frequently baffling and always intentionally so exactly when we hope to read between the lines. For now once again we gather he had singed his wings like a moth round a dazzling flame. The injured lady's brother appeared in a true blustering 18th century style and loudly accosts him dining with Copeland at the "George" Aylesbury. Here is the entry: "He delivered me two letters & demanded an interview in his Father's name. Which I refused him being tit for tat. I did, open and voluntary, justice to (the lady) .. He left me with a declaration that the matter should not rest here, of which I took no notice whatever."!!

Clearly during the last year or more, John Herschel had got himself into a trap and once again Grahame, Babbage and Mrs. Babbage and Copeland had had to help him out. Grahame writing from Edinburgh presents the core of the affair: "Your letter has given me great vexation. I make no enquiries. But I cannot help entreating you in the strongest manner to pause and consider what you are about. I may be quite mistaken but last summer when I saw you, I examined you with attention the most earnest and quickened, as far as it could be, by the most anxious friendship. I saw as anybody must have seen that your manners, looks & health & spirits were most painfully affected by this unhappy matter, and I must tell you that it did appear to me that you did not know your own mind." X'

However on this self-same date, Herschel has made up his mind, helped by his stalwart friend Babbage. Had the

X'

matter been a trifle less serious it would be almost laughable to read the next passage in this diary of immaturity. No signs of "une grande passion"! His feelings cannot have been deeply engaged: He writes: "Asked Babbage to tea. Read over my proposed settlement with him and told him (her) conduct. He advised me urgently to break off the match and as this fully concurred with my own ideas I imparted to him my resolution to do so and we consulted on the best manner of doing it."! Next day "Babbage went to Slough to inform my mother of my determination respecting X," whilst Herschel sat down to write the fateful letter from London and thus avoid what he occasionally calls "scena cum matre". All this was before the date of Carter's trial. Then Copeland, as befitted a Naval Officer, stood by him when a personal assault seemed possible at the George. And yet, even after this apparently decisive attitude Herschel allows himself to get drawn into further correspondence with the young lady, till some weeks later we read with a sigh of relief: "Dispatched a final letter to X." - And it really is the last.

This never was an "affaire de cœur". The lady was just 18 when it ended rather like a damp squib.

From a glimpse at some letters he wrote her when she was about 16 it was simply a somewhat fraternal feeling on his part for a pretty little girl. The letters are merely rather ponderous descriptions of places he is visiting and are intended to be 'elevating' for a young person. Then she suddenly grows up and the fat is in the parental fire! At any rate, being scorched, he was the wiser for the episode.

Meanwhile towards the end of the year his concentrations and speculations on magnetism even penetrate the dining-room at the R.S.Club. There is the note: "Dined at the R.S.Club. Sat next to Mr. Barlow and talked of nothing but magnetism."! Galvanism and Voltaic experiments figure more and more prominently as the grand climacteric approaches, at last early in 1824 he announced triumphantly: "Finished my Bakerian Lecture. Called on Babbage and read him my Bakerian Lecture. Called on Sir Humphrey Davy and put it into his hands."

At almost the same date he received 100 guineas from the Editor of the Encyclopedia Metropolitana, so that task is also crossed off. As for his "Introductory remarks" for Op: 44 they can lie on one side waiting for the completed labours of South and himself.

And here comes the most remarkable fact. He actually takes a 'day off' and celebrates it with Babbage. Never before & never again is such an event recorded in all his 50 years of diaries! He states: "Dies non with Babbage. Plaid (sic) Billiards and dined at 'Prince of Wales'."

Now, until he started on a six months' "Grand Tour" his thoughts like migrating swallows seem to be making preparatory flights. Preparations began by taking his name off the United Universities Club, finding he hardly used it, and then (perhaps springing from this idea of going abroad) his mother announced her intentions of having a season in town. He hunted her up a furnished house in Brompton with nice gardens "before and behind, with plenty of china and all necessaries", which she inspected and approved and it was quite accessible for the sights in London. Earlier in the year he had already taken her to the Cosmorama, and the Diorama showing Lucerne, where "the effect of the varying light and atmospheric effect on the scene inimitable." She had seen with him Hayter's picture "The Trial of Queen Caroline". (Whereas he probably went by himself or with Babbage "to see Hymenas eat Buckland's water-rats" at Exeter Change!)

The date of departure approaches: "Occupied in arrangements for Brompton, in preparing travelling apparatus ... returned to London with my Mother who has the gout."

The last line before the flight is the entry: Ap. 2nd. "Set out for the Continent."

This is his "Grand Tour" extending to Girgenti on the south coast of Sicily and home round by Hanover to call on his aunt[x] and to see the birthplace of his father.

Posting in his own carriage comfortably across Europe in the way he did with his valet, makes the journey very characteristic especially in the wayside jottings of our solitary traveller for as one critic has somewhere aptly remarked: "those who have little to bestow find little to perceive." Comments on scientists and their countries open up to us his own outlook on life, a matter we shall assuredly only get at by this cumulative effect of many details from which to draw our own conclusions. It is to be hoped they do not prove tedious.

x' To C.L. Herschel from JFWH July 2nd 1824: "My mother will have told you of my arrangements (of the alteration which my plans of life have undergone for which I see every day more reason to be thankful.) ...". This is the only allusions outside his Diary, ever made to the recent "affaire de coeur." To Graham he wrote: "My mind is tranquil & I have fully succeeded in combating the recollection of past events. Indeed I have been so fully occupied with the present as to leave little room for their intrusion."

Chapter .....

"Grand Tour"

Ap.2.1824 - 5 a.m. Rose and packed up 210 lbs. luggage. Crossed Westminister Bridge at 8.5 a.m. (Detailed notes every few minutes for the benefit of Lady Herschel). 4 p.m. Dinner at Canterbury. 4.20. Off again. Arrived Dover (70 miles) at 6.5 p.m. - 7 miles per hour. "We reached Dover after a stormy passage (coach) of 10 hours, in which poor James[x'] was the principal sufferer, but by the aid of a thick great-coat and my cloak, escaped much wetting. The snow lies under all the hedges. It is the remains of a deep fall the night before last, a foot and a half fell. I tried my new plan of noting on the road, and find it answers well. I can tell you all the alternations of Gravel chalk, etc. along the country, and very curious they are."[x²]
Ap.3. - 11.19 a.m. Quitted Dover Harbour in "Spitfire" Mail Steam Packet. Duke of Somerset[x3] and family on board. 2.9 p.m. Entered Calais Harbour. In passing my Instruments at the Customs House, they demurred at my Barometer, but on looking at my Passport and seeing my name: "C'est le nom d'un planète - il y avait un Astronome de ce nom".- "Ah! vous en êtes le fils?" - and passed my baggage immediately unexamined. Tried to bargain for a carriage. N.B. for fr.1000 very indifferent, for 500 old tumbled-down bad concern. Got from my coach acquaintance address of a coachmaker in Paris. Went to bed till 10 p.m. 11 p.m. Left Calais in the Mail. Slept till 5 a.m. next morning. Only waked at Boulogne by the three solemn knocks at the gate.
Ap.4. - Crucifix on the right. James's naiveté, who asked whether that marked spot where our Saviour was crucified! (Paysannes, pretty girls).
Ap.5. - 4.40 a.m. Arrived at G.P.O. Paris. "I met M.Arago going to the Institut whither I accompanied him. Thus within eight hours after my arrival in Paris, I found myself in company with almost every one I wished to see. Arago, M. Laplace (who is quite well, but grows visibly older,) Baron Humboldt ... M.M. Thenard, and Gay-Lussac the chemists, Poisson & Fourier the mathematicians and many more ... I breakfasted next morning with the Arago's at the Observatory, where I found M.M. Bouvard and Nicollet[x'], and made all the observations I came for. We were joined by Humboldt who gave me some very useful information respecting the Alps, Vesuvius, etc."[x²] Had a long conversation with Fourier, who said that Pictet of Geneva has represented my Father's philosophical views as anti-religious! I told him my Father would rise from his grave if he could know that such interpretations could be put on any part of his writings. Laplace took me out, and we talked of science.
Ap.6. - To Observatory. Compared instruments. New Equatorial moves by clockwork quite smooth and keeps star bisected. Examined my microscope, no tremors. 11.30 a.m. Humboldt arrived. He is so full of information that he talked too quick to follow. 7 p.m. Walked up to Montmâtre. Is crowned with a row of 6 or 7 windmills, by the highest of which I stationed myself. Superb view of Paris. 8 p.m. Returned to Paris, dressed and went to a concert at Thenard's. Met Biot. Was introduced to Chevreuil with whom I had much talk about Chemistry. Ampère got into conversation so loud about his magnetism that he disturbed the whole company and set all the ladies laughing. During Mm. Orgila's song, he stood in agonies, pretended to be so much affected he could neither see nor hear. His friends came and joked him and said he was asleep, but as soon as the song was over that instant he began, to the great amusement of Madlle. Arago (a sweet pretty éspiègle).
Ap.7. - 10.30 a.m. Baron v Humboldt, called with Mitscherlich (a most Swedish countenance, open, mild, and most intelligent) with whom talked and showed my instruments. (Dined at Fourier's). 4.30 p.m. Paid M. Marquèse fr.800 for a calêche, left Paris for Lyons.
Ap.8 - 7 a.m. Fontainebleau. Obliged to dismount the wheel, the axle being so much worn as to play in the box, which being of gun metal had broken. 10.35 p.m. Reached Cosnes (on the Loire). Supped, sent James a part of my supper and half a bottle of wine with a positive order to eat and drink. I do not believe the poor soul has eaten a dinner since he has been in France. .....

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x' James Child, valet. "He is really a most attentive, excellent fellow, he makes no difficulties and makes himself well understood, and minds no inconvenience to render himself use. ..... James goes on well, an excellent fellow, with all the simplicity of Sancho Panza about him, and his master not altogether unlike the Don!" May 12th/24

x² J.F.W.H. to Lady Herschel.

x3. Late in January the Duke of Somerset had invited him to a dinner-party en famille, perhaps as a counter-poise to Sir I. Brunel who, with Mr. & Mrs. Babbage and Sir J. Scarlett made up the guests.

x' Joseph Nicholas Nicollet 1786-1843 Librarian & Sec: Paris Observatory. Perpetrator of the original "History of the Moon 1833" which hoaxed all Europe, even its illustrations. See p

x² J.F.W.H. to Lady Herschel.

Ap.10. - 3.30 p.m. Salvigny. Mishap to basket of instruments!
Ap.12. - 3.30 p.m. Aiguebelle. A sweetly situated town. Put up carriage. Loaded James with Wallet of provisions, Drawing board, thermometer, etc., and set out like Quixote and Sancho in search of adventure. .....
Ap.13. - 2.15.p.m. Walked to St.Jean, where I found the carriage under repairs, the box of wheel being broken in half. Had a demêlé with the smith who charged 12 frs. for putting in an old iron box not worth one franc. "We slept at Chambery, for the weather was so dreadful that it would have been wretched to have travelled all night. It blew a snowstorm from the South all the evening, and when we got in, the carriage was completely muffled in snow which penetrated at every chink. You can imagine nothing more extraordinary than this entrance into Savoy. The country is hemmed in by a high perpendicular wall of limestone rock, which can only be passed at a point called the Echelles de Savoie.[x1] Here the road creeps gradually along a cliff ... above is perfectly perpendicular face of rock some hundreds of feet high, below, the precipice, and in front it suddenly terminates. ... There is but one course, - to enter into the heart of the Mountain. Conceive a tunnel cut into the front of the rock; wide enough to admit two of the largest carriages abreast, 20 or 30 feet high, and very nearly ½ mile long, lighted all the way with lamps and echoing like thunder to the roll of wheels and the crack of the postillion's whip. We had scarce left this before the snow came on in a whirlwind, and I made James get into the carriage, and we pursued our route by moonlight through a wilderness of Mountains, Snow and Cloud. James was much amazed, and it was as good as a comedy to hear him."[x2]

This experience made Herschel give up all idea of "night travelling and of hurrying to Rome like a great overgrown schoolboy ... it would have required 6 nights more travelling and the carriage had suffered so severely jumbling over the detestable roads of France, that I fully expected the axle or the wheel to give way on Mount Cenis, where from the enormous quantity of snow which had fallen, we had every reason to expect a dreadful passage. And so it proved. The snow lay 3 feet deep at least; in one place .. a wall of snow of 14 or 15 feet had been cut through, and still the carriage ran on a snow-bed not less than 6 or 8 feet above the ordinary level of the road. Yet, in spite of this, the sun was so powerful as

x1 W.Wheweell had suggested this entry into Savoy. See letter to JFWH Mar 23, 1824.
x2 J.F.W.H. to Lady Herschel.

to scorch like a hot iron. You would not know me. I shall lose every bit of skin from my face, which for 3 days after was in intolerable pain and shockingly inflamed."

By 5 p.m. they had passed the top of the Pass only to discover that the Camera Lucida had somehow jolted out. There was nothing for it but that Herschel and the postillion must dash back to get news of it, whilst James guarded the carriage. Eventually, in the snowy twilight of 7 p.m., Herschel found himself back again on the wrong side of the Pass. " 7 p.m. Descended to Cenis "Refuge No.4" in a sledge. Gravida sat in front, and used his feet to retard velocity. Shot down like an avalanche and reached Leuchburg in 20 minutes. Old Gravida prides himself on being the best horse in the country. N.B. Should have gone quicker but night was commencing. Stars of 3rd mag: visible. Polar is very bright. 8 p.m. Left Leuchburg in a Charrette drawn by a mule, which I hired for 6 francs. No room in the wretched inn. 9.50 p.m. Lodged in a house in Verney.
Ap.15. - 4.15 a.m. Left Verney. Mounted mule and rode up old Mount Cenis Road. Frightful to see where I descended last night. Bears and wolves on Mount Cenis. (Bear, 1500 lbs.) Demêlé with landlady of Golden Cross (where James and carriage had probably lodged). Descent of Mount Cenis. Snow 10 ft.deep, and height of posts 16 ft. Awful valley and cloudy. Vision quite scorched with sun and snow. Sensation dreadful." Travelled on in the night till:
"Ap.16. - 1.20 a.m. Arrived at Turin ..... Went to Conti's about a hygrometer to be repaired. He made a bad job of it. Lost much time in endeavouring to readjust it myself and at last gave it up as a hopeless case and sent it to Conti again. "I have fallen in with M.Plana, a celebrated mathematician (who married a niece of the yet more celebrated Lagrange) ... I introduced myself to him "sans cerémonie" by calling at his house ... He received me like an old friend ... He has one daughter, a pretty little Italian espiègle of 10 or 11 years old. Plana has talent and industry and system, as well as depth and research, qualities which at an early age, have placed him nearly at the head of the modern mathematicians, but he is in addition to this, a frank, unprejudiced and very friendly person."[x]

" We had a good deal of scientific chat. He abused Dr. Young, whom he remarked: "N'est point geometre." He

x J.F.W.H. to Lady Herschel. Plana, Giovanni. 1781-1864
nephew of Lagrange.
Royal Astronomer at Turin.
Wrote "Theorie du mouvement de la Lune"
(Gold Medal RAS 1840) (1832.)

seems to underrate Laplace. He says Young is wrong in his conclusions about refraction. Went into Observatory with Plana. Passed evening in Observatory with Plana and stargazed. (N.B. Madame Plana uses "Sacré", etc. in her conversation, so does Plana before his wife!!)
Ap.18 - Experiments.
Ap.19 - 2.50 p.m. Chapelle de M. St.Bernard de Ferrara visible in telescope. It is where signal was lighted to determine difference of longitude of Turin and Milan. (Milan sometimes visible 2 or 3 days in the year.)
Ap.21 - 8.30 a.m. M. Bonvicini and I rode on horseback round the town.
Ap.22 - 5.44 a.m. En route for Genoa by bridge over River Po. Monte Rosa very grand to the north. Road superb. Country luxuriant beyond conception.
Ap.23/24. - Poplars putting out their first yellow green verdure, wheat a foot high, rye 2½ and in full ear. 6.30 a.m. Plains of Marengo. Plain a dead flat, like one immense nursery ground. In the Poplar wood behind a long white house, the Postillion pointed out the spot where Desaix was killed.[x'] 12.20 p.m. Top of road above Genoa. Descend to Ponte Decima. Road incomparable. (They put a third horse as a "renfort" to drag you up.) The boy was very thankful for a franc. They trot down at 9 miles an hour. Gave to 6 beggars for their fine old Roman faces (!!). One exactly like Sir J. Reynold's "Ogolino". 2.40 p.m. Genoa. 6,000 men in the Town;[x²] at present lodged in Barracks and old Churches, but a fortification is building for them. Passed a church ruined by the French[x³] who suppressed all Convents and knocked down many Churches.
Ap.24 - 2.30 p.m. Baron de Zach's. Found him at home in the "petite campagne, Palazzo Durazzi". Gave him Pons' medal. Pons he tells me, was a "concierge" only, i.e. a a menial servant to attend on porter, clean and sweep the rooms, etc. and that he cannot even write. (N.B. This must be false), and that he knows so little of Astronomical instruments that he (Zach) never could teach him even to read a 'vernier'. Took tea with the Baron, who expressed himself "étonné" that Dr. Young did not belong to the Astr: Soc. N.B. The Palace next Zach's, a large yellow house, was built by Richard[x'] Cromwell, - son of Oliver Cromwell. Beautiful view from Zach's window."..... "I do not know whether I mentioned having fallen in with Zach, who is a most amusing old gentleman, full of anecdotes, and the greatest gossip I ever met with; the worst of it is, he is a sad scandalmonger and delights above all things, in hearing that people are together by the ears, and in setting them together if they are not. He is a great rage with Maria Louisa[x²] and with Pons, who he says, has got all his instruments and cannot use them, and won't give them up ... It seems to me that Zach is jealous of him[x³]"....

"Tried Brabanti's instrument for radiation and found the lens not large enough. Palazzo Durazzi is now occupied by the King of Sardinia. Durazzi is now so pressed for money, that he is selling his library for nothing. Dined with Zach. Present M. von Müller who[x⁴] is something about the Court of Coburg. Zach abused the Duke of Wellington for not speaking stronger at the Congress of Vienna about Spain.

Frogs croaking. Left Genoa, 1.50 p.m.... "I was glad enough to leave Genoa, which is a filthy hole, and I may add, a melancholy one. The magnificent palaces of its nobles are let out in lodgings and their collections of all kinds are daily coming to the hammer. The Durazzi Library was on sale just before I arrived, and Zach had bought the Acad: Sci: Journal .. but the sale was stopped on account of the King of Sardinia (who is afraid of being assassinated at Turin), having shut himself up in the Durazzi Palace, and no access allowed. The tyranny of the Sardinian Government is abominable.

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x' "Desaix was the true hero of Marengo (1800). He led his troops with consummate gallantry, and met his death in the thickest part of the fight, ... he won the day for Bonaparte and ... by his bravery at Marengo, the power of the First Consul was established, and he and his family were saved from utter ruin, if not actually from the guillotine." (R. W. Jeffery. The New Europe).

x² Troops of King of Sardinia, Chas: Felix.

x³ Victorious army of Bonaparte.

x' After the Restoration, in 1660 he lived, secluded, on the Continent for several years.

x² Widow of Napolean Buonaparte, commonly called Marie Louise, Duchess of Parma.

x³ J.F.W.H. to C. Babbage.

x⁴ See C.L.H.'s Diary, Sep.1826 and elsewhere

I heard some anecdotes of it from Zach as having lately occurred. Which made me thank God I am an Englishman."x'
"3.20 p.m. Ponte Decima again! Three horses. Pay for 4. Cantonniers still at work on this noble new road. They wear white hats, turned up on the left with a tin badge. Ap.27 - 10.10 a.m. Vaghera. No horses. Maria Louisa has 10 carriages and has ordered all horses. 12.5. Nightingales in all the mulberry trees.

2.15 p.m. Met Maria Louisa, a fair, rather sad-looking woman. 2.40. Crossed Frontier.x2 No search or anything to pay, only passport. N.B. Postillions wear gilt badges and horns on boots. 5.27. En route for Piacenza. The loveliest evening in the world. The spring is advancing visibly, almost hourly. Rich scents, the steam of vegetation. Nightingales singing. 6.35. Monte Rosa still visible.

Wed. Ap.28 - 5.35 a.m. Passport visa'd at Gate of Piacenza on leaving. Sky cloudless and the loveliest morning conceivable. 8.4 a.m. Left James in charge of the carriage and walked to Castello D'Arquate to examine the sand-hills. 10.47. Heat so insupportable that forced to return." (After a 3 hours' walk. It is a good 5 miles to Castello).

"Ap.29 - 12.50 a.m. Arrived at Modena.x3 We were late and detained by the Douaniers and gatekeepers in a most annoying manner. Here another cloudless morning. I called on M. Amici, whom I found engaged in preparing microscopic objects. Introduced me to his wife, daughter and 2 sons. Mme. Amici a very pleasing friendly little woman, and no fool. He then showed me his instruments and some experiments. Not being yet dark, placed one of his 8 ft. telescopes on a Castle 30 Italian miles distant on the Apennines, and saw the Machicolations of the towers (not merely the battlements) and distinguished the windows, though in the shade. Wonderful atmosphere. No trembling. Just sunset. The sun sunk with a purity of light I never saw before. We saw Jupiter with a distinctness I never saw equalled, it was evidently a globe, not a flat disc.

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x' J.F.W.H. to C. Babbage.

x2 Into Duchy of Parma. Held by Maria Louisa as Archduchess of Parma.

x3 Allotted to Francis IV of Este in 1815.

" Descended and found the party at cards (strange cards) all in undresses. An old lady in a dress like a Cook-maid. The Amici's understand English well. "Amici and his family are uncommonly interesting people. As a man of Science, Amici holds a pretty high rank and as an 'Artist', among the first. His reflecting telescopes are really magnificent instruments and in light, distinctness and good workmanship, equal anything I have seen. We had a night's observation together, and measured some double stars, Jupiter's diameters, etc., with one of 12 in aperture and 8 feet focal length, and a new Micrometer of his construction, which is very good. He has a great notion of inventing new instruments and is now going to commence a very extraordinary one, a glass circle of 3 feet diameter, with diamond cut divisions, which are to be seen in the field at the time of observation with the stars, (by what contrivance, I do not know). He appears fully aware of the difficulties of the project, and prepared to encounter them. The glass plate on which he is to make the first trial, is now in his house. It is evident that if the English instrument makers are to cope with such men as Amici and Frauenhofer and Reichenbach, they must mind their P's and Q's. I have seen two of Reichenbach's Meridian 3 foot Circles, one at Turin and one at Modena, and I must say their workmanship is the finest I ever beheld. Without microscopic examination, I can't speak to the division, at least as to its correctness, for its beauty and delicacy are unrivalled. The system of counterpoises is beautiful, and not the least in the way."x'

In a further pen-sketch of Amici, Herschel told his Mother: "M. Amici, a man of sound science and an 'artist' of the very first class ... with whom profit is a secondary consideration, is the only foreign artist who has attained perfection in the construction of large reflectors. He was so good as to show me several, which are really superb. The mirrors of three of them are 12 inches in diameter, and the polish exquisite. He is indeed a most superior man, and if I mistake not, is as distinguished for the qualities of his heart as he is remarkable for intellectual attainments ... M. Amici introduced me to all the professors at Modena ... and at parting, would make me accept a valuable instrument of his own invention and construction for the measurement of double stars.

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x' J.F.W.H. to C. Babbage.

x1 Micrometer of his own invention.

Ap.30 - 3.30 p.m. Left Modena. 4.50. Enter Papal Territory. 1st Douane no trouble, no pay even asked. 5.45. Left Samoggia. Travelling a perfect luxury. The scent of the Hawthorns and the wild blossoms overpowering. Purest of blue skies, brightest and tenderest of setting suns. Everything is beautiful. Noticed a young peasant girl of 15, topping the wheat, a face and form as perfect as Nature ever produced. 8 p.m. Bologna. Walked out into the Town, but growing very dark, lost myself in search of the Inclined Tower, which I had read of at Pisa and fancied it at Bologna. Could not find it. Next day I found it, but it is not what I expected, and there is some strange mistake. At all events, it is a most extraordinary thing. There are 2, "Torre degli Asinelli" (they must have been 'asses' who built it), a tall square Machicolated tower with small loop-holes all the way up, and immensely high and immensely ugly. The other, a square lump, "Torre del Garisendi", which is lower and leans in a fearful way to the E.S.E.
May 1st - 6.30 a.m. Left Bologna for Florence. 7.30 a.m. crossed an ugly river. All the rivers in the plains of N. Italy are ugly. Wide wastes of the shingly gravel which forms the plain, laid bare and dry. .... 11 a.m. to 12.30 p.m. Climbing all the way then the off-wheel horse fell. Going down a moderate declivity, the carriage wheel came upon him, and in his struggling, it upset the carriage which rolled over the left side, there being no parapet, and turned fairly over into the valley.

To James Grahame. May 2nd, 1824. ... "Yesterday my life, with that of my servant and two postillions, was preserved by what I can hardly regard as short of a miraculous interposition ... I have never, you know, been a believer in special interpositions of Providence, but in this case, it was impossible not to perceive that our safety was the result of a combination of circumstances that had the appearance of being so disposed as to render the accident as harmless as possible. Had it happened a hundred yards from the spot where it did, the fall must have been fatal to all, for the precipice was terrible ... I came off without the slightest injury ... Tell me, have I not reason to be thankful to Him who "took me out of the horrible pit, and set my feet upon the rock?"* ... Do not mention this occurrence, lest it should come to the ears of my Mother and alarm her." Herschel also described this

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*See p. 104 above.

accident to Babbage. May 9th, 1824. ..."We were crossing the Apennine hills on the 1st of May between Bologna and Florence. It is a wild mountainous tract ... the road, though good, is narrow, and there is nowhere any parapet like those that inspire a sense of security in the most awful parts of the Simplon or Mont Cenis. We had 4 horses and 2 postillions who were taking advantage of a gentle declivity to put their horses into a moderate trot, when on a sudden, the off-wheel horse fell and the wheel came upon him. As soon as he felt the weight of the carriage, he began struggling, broke all his harness to pieces and fairly turned the whole machine over the edge. The leaders broke their traces and escaped with their driver, but the near wheeler with his Postillion, (who did nothing but yell out: "Oh Dio!"), came down with us. It was like the fall of Phaeton as you see it in pictures (don't think I mean a pun - it was no Phaeton, but a Calèche as I told you before). It pitched on its head, which was reduced to its elements of Iron, wood, glass and leather. Had the head been up at the time, I must have shared its fate and been amalgamated with all this heterogeneous mass. As it was, I was, most providentially on the side of the carriage from the edge, and was projected out with velocity, to which I owe my life, for I thus got the start of the carriage which rolled over and over. I felt it going, but had not time to spring out, and the next thing I perceived, was being on rough ground, rolling heels over head, unhurt, and hearing the carriage crashing above. Without the least idea where I was going, and fully expecting to be overtaken and crushed by the falling vehicle, I exerted I am sure, the strength of two men with hands, feet and head to increase the rapidity of my motion, and if possible, get out of its way. I might have saved myself the trouble, for after one or two somersets, it lay still enough. When I rose, the first thing I saw, was James standing by the wreck, staring aghast - but (thank God) unhurt. His escape was even narrower than mine, and indeed almost miraculous, for he had jumped off the box, but not jumping judgematically came between the horse and the splinter bar, and fell in the thick of the mêlée. To crown all, the Postillion crawled out from under the horse, which lay doubled up between the wheel and broken pole, and he too, was without a bruise, and only a little scratched having fallen into a bramble bush. Even this I escaped - having been shot clean over all obstructions. You may easily conceive

the wreck of instruments, etc. which had taken place. Every individual thing was scattered abroad seriatim, as if purposely disseminated. I am sorry to say Captain Sabine's Barometer was broken. It had however before become quite useless, having had its scale shaken out of its place, and its mercury evacuated through the joinings of the cistern, by the lullaby motion of the French pavée, though every care was used to favour it. Troughton's escaped, and is now just as it left England. As it was, we came down so commodiously that with the help of 6 men and 4 oxen, we got the carriage up, and in less than an hour, were on the road to Florence, which I should have reached that night"x'(but that at) 4.17 p.m. I was told by the postillion of a Volcano among the mountains which still emits flames, "si vede il splendore! - la fiamma di notte!" " 5 p.m. Enquired of postillion if volcano near. Said "Yes", and showed it in Telescope. Set out to see Volcano. 5.12 p.m. Arrived, 12 paces circumference. Three or four places where fierce flame rushes out. Flame red in shade. No smoke on slope of hill, dip to South. Very slight smell of Bitumen. — "it is the Fire of Pietra Mala near Covigliajo and is only a spiracle of carburetted hydrogen, which oozes up from holes and chinks in a limestone hill"... " The flame is considerable and fierce. The surrounding country is evidently volcanic, the limestone being overlaid by a bed of Lava in a very beautiful way. Eustace"x² who mentions this fire, ridicules Pliny for a story of an Eruption hereabouts in the year of Rome 662, but the features of the country bear such testimony to the action of fire, that this eruption cannot be regarded otherwise than as an authenticated historical fact ... Eustace"x² is very inaccurate ... he says the flame emits a strong smell like ether, gives little heat when burning, and leaves the ground cold and without the usual signs of fire. When I saw it, it had no smell or smoke, and when I extinguished it and collected the gas in my hat turned down on one of the spiracles, it only had a bituminous scent, so slight as to leave me in doubt of its reality. It is intensely hot ... and the lumps of stone are black with deposited carbon. This and the strong light of the flame which is visible in broad sunshine, and at night illuminates

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x' J.F.W.H. to C. Babbage.

x² See "Travels" by Eustace.

all the surrounding mountains, (making Pietra Mala a capital spot for a dance of witches by devil-light), prove the gas to be carburetted hydrogen."x'

May 2 - 6.25 a.m. Left Maschere. The cypress now in great abundance. Hill and dale in beautiful swells and falls, now rising to grandeur and now softening in sweetness. The girls wear black beaver hats with a black feather falling down, with a great air of smartness. 9.35 a.m. View of Florence.... "It is hardly possible to imagine anything finer than the Vale of the Arno as seen from the height immediately above Florence, not to speak of the City itself, with its Domes and Towers and Palaces, which lie in magnificent confusion at our feet ... The heat has been quite enervating and effectually prevents one from doing much in the hours from 11 till 3 or 4 in the afternoon ... I walked out before breakfast to the romantically situated height of Fiesole ... The ascent is steep and practicable only on foot or mule-back, but the view from the summit beggars all description ... I was induced by the misrepresentations of a person ... to go on to Pratolino a country seat of the Grand Duke ... I returned from this excursion ... desperately tired ... and exclaiming against Italian miles and Italian hunger (having been near 9 hours on foot), while poor James, who carried my drawing apparatus and some other necessary implements, was quite done up ... As yet, however, I do not find the heat disagrees with me, but on the contrary, am certainly better in health than when I left England."x²

Florence, Madame Humbert's Hotel. (Count Demidoff is at this hotel, with 40 people, a large cockatoo, a monkey and a pet dog!) Dined at Madame Humbert's. Walked out along the right bank of the Arno. Full of nightingales singing by moonlight, bird of a peculiar low melancholy monotonous call. The frogs kept up a perpetual rattling murmur. A single boat gliding down with 2 fishermen. Twilight fading over the distant gleam of the river. Whoever would enjoy a cool evening after a hot day, let him go to the Coffee House "del Arco Demolito", and sit at the door on a moonshine Sunday evening, and call for "Sorbetti al cidrato." He will then know the enjoyment of simple animal existence!

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x' J.F.W.H. to C. Babbage.

x² J.F.W.H. to Lady Herschel.

May 12 - 5.5 a.m. Quitted Florence Gate for Arezzo. Km. Humbert's, a respectable systematic house and charges very reasonable. Not much attention from servants, but Count Demidoff keeps the whole house and street in a perpetual bustle. He has private Theatricals every 4 or 5 days. Last night, the street was blocked with carriages till midnight and kept me from sleeping. Obliged to rise at 4 a.m., wished Demidoff at the devil.

May 13 - 5.5 a.m. Left Arezzo for Foligno. 9.25 a.m. Crossed Tuscan Frontier[x]. 10.25 a.m. Left Pope's douane (where 80 Pauls are deposited, and baggage searched) for Rome. Took a view of Lake and battlefield of Trasamene, now a vineyard, cornfield and orchard. Lake like a mirror. 11.40 a.m. Very neat!! Over-turned our voiture owing to the third horse which our boy could not manage, turning short round in going over the bridge! James jumped off the box, and I vaulted out of the carriage in a moment, and James only saved it by running to the horse's head! 12.35. La Maggiora. The most cut-throat looking place I ever beheld. Carriage surrounded by at least 20 of them as much like assassins as possible. On leaving it, a fellow with an old blazing-iron slung by his side "à l'assassin", trudged along with us, he spoke to the postillion, and I fished out my pistols and saw that the priming was fresh. Poppies (wild) of the intensest deep-red conceivable, not the pale faded scarlet of our field poppies, but the full prismatic red.

May 14. - 4.50 a.m. Left Foligno. 10 a.m. Left Strettura. (N.B. Delayed at Strettura by taking off wheel). 11.20 a.m. Terni. A considerable but nasty town. Rest till the 3 hot hours are over, and at 2½ p.m. leave for the Falls. A tolerable Inn.

First view of Falls of Terni. It sports over a horizontal table of Rock at foot of two pyramidal tables. On level of this table, a thick bed of stalagmite concretions forms a rich semi-circular plain bound in to the right by the hills, on the left by precipice. 3.37 p.m. La Fuca. A point of view through a little passage, out in the thick bed of stalagmite to where river shoots above upper fall. Descend the steps and narrow paths in the calcareous tufa. The walk back, the most beautiful imaginable through an Orange-walk smelling deliciously and enlivened with song of nightingales and across bridge to village of Papigno but shockingly infested the whole time by swarms of little beggar-brats and great beggar-men, who tired me to death by the most amazing officiousness, thrusting themselves in the way everywhere and literally extorting money to get rid of them, only to be succeeded by others. N.B. A little girl rode as Postillion on the 3rd horse up this hill.

May 15. - Terni 3.50 a.m. Waked this morning at 3.50 by the braying of a dozen mules under my window. It is the most dreadful discordant noise conceivable, and gives you the idea of a ferocious beast roaring over his screaming victim. All the town was up and alive by 4 a.m., and at 4.30 a.m. the waiter took away a stale roll and brought me a hot one fresh from the baker's, and urged my departure having "Molti Inglesi" coming from Rome. It is urgently necessary for winter visitors to quit Rome before the middle of May." It becomes dangerous to health from the malaria, dormant in the winter but overwhelming the inhabitants with its insidious ague-fever in the heat of the summer months. The desolation of the Campagna is directly attributable to this plague. For no apparent reason a great tract of country lies deserted. In May its natural beauties give no hint of the lurking danger. The little hills and streams in all the freshness of young spring and ever-varying light and shade, the luxuriant growth of broom in full golden bloom, the slopes and valleys deep in waving grass and flowers present an endless spectacle of loveliness and yet as the traveller drives onward towards Rome not a sound but his own wheels is to be heard, no villages, scarcely a tower, or only a mournful ruin on a hill-top, stands out to suggest a population which surely should abound in this neighbourhood. All day Herschel drove through the carriages and postchaises of English families hurrying away from such a Rome as this, till at last on crowning one of the little hill-tops, the view of Rome opened out before him. "Ecco Roma!". With this shout the postillion always rains up and points his whip at the view. St.Peter's stands below looking like a closed water-lily in a lake. The change in the whole scene is impressive. Thirty miles away lie the Alban Hills whilst beneath the brazen sunlight pants a level Campagna stretched from the Apennines on the left to the distant line of Mediterranean on the right. After 27 minutes

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x Into Papal States restored to Pope, 1815.

steady trot Rome is reached past the Castle of San Angelo and through the Porta del Popolo. Rome's vastness overwhelmed John Herschel just as much as other young men. His original intention of keeping his mother minutely posted up in his doings failed completely; he wrote instead that "I begin to weary and wish it over" and in mercy spared her a mere list of sights. He confessed to a fatigued and feverish night but woke at dawn on Sunday for his first morning in Rome and his first impressions. "Nothing mean or paltry except the vile moveable pulpit". On the contrary, they are "all of the noble kind, even the touching piety of the poor Labourers (tho' Sunday) with sacks and mattocks crowding in to worship, careless of all but their object to bend the knee at some favourite shrine or to kiss and press their forehead against St.Peter's bronze toe". On Ascension Day the ceremonies of the Church impressed him in all their splendour. It was the inauguration of an Anno Santo when Pope Leo XIII would declare a Year of Jubulee whilst all Rome knelt below him in the Piazza San Pietro. After a jangling of church bells and a great hum of voices,- no shouting,- the Pope appeared standing far above on the balcony of S.Peter's. Now came the roar of cannon from San Angelo followed by sudden peace whilst the voice of the Pope intoning his Blessing floated down through the air. Here followed an expectant pause whilst he descended to ground-level to be carried away to the Vatican in the Sedia, shoulder high through kneeling throngs. Herschel for his part hurried back to the Piazza di Spagna intending to carry his barometer from the hotel to the top of Antoninus's Pillar. His plan failed. The barometer was out of order, would not tick and appeared to have a great bubble of air. Who had touched it? James swore he had not and fetched the waiter. An unholy row arose, but the mischief was done.

The "Ancient Rome" in 1824 still lay deep in mud or ruins. The first objects to catch the eye the Arch of Severus, half its height plunged in a pit, and the Forum turned into a Cowmarket surrounded by wheelwrights' shops and swarming with ragged children, braying mules and jargonning cow-herds. The degradation of Roman feeling and Roman glory revealed in the destruction of the Capitol, stone-masons actually cutting up the columns on the spot, and by the disgraceful state of the neighbouring streets (since pulled down). Sleeping lazzaroni lay anywhere in the sunlight and lazy halberdiers of the Vatican guard lounged in their "scaramouch" dress round the Papal Entrance. At that time within the Vatican the Raphael frescoes were falling in great flakes leaving bare laths against the stone vaultings.

? Raphael

In the summer of 1824 the only scientist left in Rome was Scarpellini of the Umbrian College, a man who collected instruments more as a hobby than for use. Herschel, catching a glimpse of him with his coffee sitting at home in his short-sleeves, brushed aside the excuses of the servant and stepped in for two or three hours excited conversation and experimenting with Scarpellini's instruments. "He has a good lathe and dividing engine and has made a very respectable quadrant on a vertical axis, with all the adjustments and divided in centesimal degrees and twelfths (so that it can never be much used)."

Herschel hoped to get on to Naples by water. This seems impossible. Hearing that twice a week an armed Courier leaves Rome in the afternoon to make the dangerous drive (or gallop) of 24 hours, he and James at three o'clock one morning, skirted the Pontine Marshes in this mail-coach. "A sweet yet melancholy scene,, the morning mists sleeping sweetly, the sun in watery clouds faintly gleaming over them. The coach escorted all night by armed Dragoons and, at the last stage with additional guards, it went at the full gallop. The peasantry go armed, horrible blackguards with very good blazing-irons. The road is beset with guardhouses, little towers and watch boxes".

All next day Vesuvius appeared or disappeared beyond their changing horizon till as they trotted up the last avenue into Naples, it formed a solid background for the town. The Customs held no terrors for Herschel! He says "on arriving we glided with an easy nonchalance past the three 'douanes' and exclaimed at the camp of 2,000 soldiers in the large Piazza."

Naples. "The suite of apartments I am occupying are really superb. James is now quite happy, for he has a little parlour-bedroom and kitchen of his own, (and cooks his own dinner I believe), and shuts out all the foreign outlandish people, whose dirty ways he cannot abide."

June 1. - Rose late this morning, having been much fatigued last night. 15,000 Austrian troops are in the Kingdom of Naples. Batteries, etc. in all directions.

June 2 - 9.45 a.m. M. Monticelli and Prof: Daubigny[x'] called. We went together to the British Minister Mr. Hamilton, where I was received with all possible politeness, desired to make his house my home, etc. June 4 - 8 a.m. Lake of Agrano for Grotto del Cane ... 2.40 p.m., just in time to dress and get to Mr. Hamilton's at 3¼ (3 o'clock nominal dinner hour). At dinner, Mr. and Mrs. Hamilton, Lord and Lady Howden, Mr. Montagu, the Prussian Consul, ... an Attaché to the Russian Embassy and others. Horrible story of the murder of a Roman magistrate in a Church of Pisterzo (or Pisterno) by 30 Brigands on Ascension Day last. (This day week). They dragged him out and killed him in sight of the congregation, and tore out his heart.

Accompanied Mr. H. and the Prussian Consul to the Quay and took boat to the steamboat which sailed into port here the day before yesterday. (N.B. I saw it enter and made James look at it, but had no idea it was the first entry of such a thing into the Bay of Naples). Fortunately the order for taking off Quarantine, arrived at the moment we came alongside, and so we were admitted on board. Superb view of Bay of Naples from water. 72 Horse power, length 117 ft. 3 days from Minorca. [x²] Accompanied 6 days by a sloop with coals from England. Atmospheric engine, copper-sheet boiler. (Never let the sea-water evaporate to saturation but empty the boiler.) To run between Naples and Palermo. Belongs to a Neapolitan capitalist, a Scotch Captain and crew. 14 men besides engine men. Expects to make the passage in 22 hours. Spoke a ship just from Algiers with dispatch for Sir Harry Neale, the British Admiral, who is expected here in a few days to collect his force to bombard Algiers.

(News of the discovery of the Portuguese conspiracy, and escape of the King on board a British Ship. Query: is this what the "Pandora" has been doing?)

Evening. A Party at Mr. Hamilton's. Present: Austrian Minister, General Fichelmont and his wife. (The most beautiful woman imaginable both in form and face, and though a little coquette in her manner and dress, yet very fascinating.) Sir Ferdinand Acton, The Prussian Consul, the Russian Count Esterhazy (Not Prince), and I presume almost all the English, male and female, in Naples. From Hamilton experienced every possible attention and was personally introduced by him to every one present!"

A great adventure began two days later which he described to his Mother as follows: "From Crater of Vesuvius. June 8th. ..."I began this from a strange and awful place! On the evening of the 7th, I set off .. intending to ascend Vesuvius by torch-light. Just as we had got our complement of donkeys and mules saddled, it began to rain (the only night of rain we had), and we had to remain at the house of Salvatore, the Principal Guide of Vesuvius till four the next morning. We made our first observations at a Vineyard called Ginestro, and then to the "Hermitage" ... Here we took coffee, made another set of observations and walked along a narrow ridge of verdure in the midst of desolation not to be described. At the foot of the great cone, we left our animals and started the most difficult part of the ascent on foot. Short but very fatiguing. (It took 55 mins.). It is rendered so by the great quantity of ash cinders and Scoriae in which one sinks ancle-deep at every step. Arrived at the Crater, I made haste to climb to the edge and look down. The sight of the deep and awful gulph which opened below, struck me as the most tremendous thing I had seen. It is an enormous pit, the bottom is sandy and flat surrounded by sloping banks of loose stones, etc. The fire-eaten Rocks which form the Crater are all composed of lava, and are full of rifts and holes from which a continuous smoke issues, so there is no possibility of descending to the bottom, or even ever so small distance down the sides. I could not ascertain its depth but should judge it to be 700 feet or 800 ft. While M. Covelli was arranging some chemical experiments, I ascended to the highest peak, called the Palo. Here I made my observations. We were fortunate enough to witness the falling of a large part of the side of the Crater opposite to which we stood. Like an avalanche, it gave the noise of thunder, or rather I should compare it to that of a thousand coppersmiths at work at once on an immense boiler, being a dismal brazen din, mixed with the sound of a ringing of bells out of tune; a sound truly infernal as if Vulcan and all his Cyclops were at work together.

"I dined to-day with Count Camoldole .... The party consisted of the Count and Countess, the Duke and Duchess of Casole, (the Duchess is a niece of Murat ... and resembles his picture a good deal). The Duke and Duchess of Trecasé ... M. Monticelli, etc. ... You will not easily imagine anything finer than the Bay of Naples from the

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x' Prof: C.D.B.Daubigny, M.D. 1795-1867. At Oxford: Prof: of Chemistry, Botany, Economics. Wrote much on Volcanoes.

x² She was "The ci-devant 'Superb' of Glasgow".

windows, especially when lighted by a full moon in a calm evening and with a cloudless sky."
June 9. - Dined with Monticelli. His contempt of the Government and people. The calm contempt of an elderly man without indignation ... Though much fatigued, I went to Observatory. (Compared instruments). 11.35 p.m. Went to bed half-dead with fatigue, and in great pain from a blow on the foot by a large Vesuvian specimen let fall by Monticelli on my toes. (N.B. He presented it to me, it had nearly killed him before!).
June 11. - 3 p.m. Dined with Mr. Hamilton. After dinner rode out with Mr. Hamilton and the Prussian Consul to the marshy Plain of Bagnoti to see the new road now making to Pozzuoli and the very curious ancient aqueducts? hollowed in the rock. They are just discovered. (Skeleton found). Descended the well.
Sunday, June 12 - 11 a.m. Chapel at Hamiltons. 2.25 p.m. Dined at 'Corona di Ferro'. Left 'Ercole' because they cheated me over some cold provisions.
June 13th. - 6 a.m. Rose and finished calculations of height of Vesuvius sent it to Monticelli. Occupied until 12.
June 14. - 12.15 p.m. Left in a gig for Pozzuoli. Near the hill at the foot is the principal spiracle[x'], a hole 4 or 5 in: diameter from which arises a strong blast of steam and sulphuretted hydrogen (not sulphurous acid). It discoloured all my buttons and James's silver watch in his pocket.
June 15. - Attended the Royal Academia "en collègue". A paper of M. Cavelli's read, containing account of his expedition on Vesuvius and a note of my measures.
June 17. - Corpus Christi. The greatest fête in the year. The King[x²] walks bareheaded to Church. I got a good view of him at about 4 yards distance. He is a very remarkable-looking man, and very like his pictures. It is an owl-face. Immense number of soldiers lining the street on both sides. In one part 3 deep. There could not well be less than 10,000 under Arms. 4.15 p.m. Dined with Hamilton. Present Admiral Sir Harry and Lady Neale of the 'Revenge' off Naples. (500 men). [N.B. Admiral Neale's anecdote of the old Admiral in the House of Commons shouting: "Having been twice taken aback by a squall from the Chair!"]

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x' The Solfatara.

x² Ferdinand I of the United Kingdom of the Two Sicilies. 3rd Son of King Charles III of Spain.

Opera with the Hamilton party. "La Vestale". Paul danced ... The King in the Box opposite.
... "The next thing I did, was to make a day at Pompeii. ... Conceive a modern town suddenly cased up, ... arrested, fixed immoveably, and bottled up for 17 centuries ... and you may conceive at least the nature of the spectacle Pompeii exhibits. ... But the Theatre at Herculaneum is still more wonderful and even awful. You stand on the Stage but now it is 50 ft. underground and in the place of the applause of a cheerful audience, a black immoveable rock like a huge gloomy curtain fronts you, and overhead the faint roll of carriages in the streets of Portici murmurs in your ears like low thunder.
I dined with Mr. Hamilton.... A Brother[x'] of my old schoolfellow Strangways, and Lord Ilchester was there, who returned yesterday from Sicily.... I should not wonder if I were to take a trip there.[x²]
June 19. - 1.45 p.m. En route in the steam-boat for Palermo. Passed Flagships in fair style and multitudes of boats keeping up a short time with us. (Prince of Patuillo on board).
June 20. - 1.30 a.m. Surface water-heat taken up in a bucket 70°.1 F.
..."The night was beautiful, the stars splendid. Constellations not visible in England, and the brightest parts of the Milky Way which we never get sight of, kept me on deck all night. (Not to speak of the heat of the cabins below)[ø³]
In sight of I. of Ustica. Sicily also in full view, a bold rocky shore. A Neapolitan brigantine, (a considerable 2-masted vessel) in full sail before us. She left Naples on Thursday night, 46½ hrs. before us. 11.55 a.m. Brigantine fairly passed! 1.45 p.m. Arrived at Palermo on the Parallel of the mole. A general assemblage of all the boats and Population of the place. Then made the tour of the Bay. People crying "Viva!". 3 p.m. To "Prince of Wales" Hotel. (An English Proprietor).

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x' In 1826 Strangways was Acting-Minister at Florence.

x² J.F.W.H. to Lady Herschel.

ø³ J.F.W.H. to Lady Herschel.

"This is indeed a strange country, and to me like a new world. The cloudless summer skies and glorious sunsets - the deep indigo tint of the clear glassy sea which seems to enjoy a perpetual immunity from ye storms which disfigure our ruder element, the intense verdure of the thick orange-groves intersected with majestic hedge-rows of tall spiky aloes and impenetrable thickets of enormous Cactuses, (the Indian fig[a]Cactus opuntia") the sunburnt hills and scorched inhapitants with y[r] uncouth jargon, wild expression and half barbarous habits, form a picture that impresses itself on ye imagination with a force not to be described."[x1]

7 p.m. Found Piazzi[*2] in bed through weakness, not for illness. A fine respectable old man. Preserves his intellect and speaks with vigour and precision, only requires a little time. He planned the Observatory at Naples, or rather altered Zach's plan, which was ridiculously expensive, for instance Zach had planned a large dome to be "couvert de cristal", i.e. a glazed Dome! Three Priests with Piazzi, who lay in bed with his clothes on and all the windows shut and the room insufferably hot. Went to Observatory with Cacciatori.[x3] Cacciatori had a narrow escape in Revolution of 1820. He was (seized), led to the market place, and a file of the populace were going to shoot him, when a friend called out from among them: "Complice! complice! a carcere." ("He is only an accomplice. Imprison him.") So they put him in prison, thinking to get some intelligence from him. Thus he was saved from immediate death, and next day, finding who he was, they released him. The Instruments of Piazzi (by Ramsden) were not touched, but many of the observations[x4] in M.S. were destroyed in the Library, which was pilleged. The Ramsden Circle - In good order. All kept bright and

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x[1] J.F.W.H. to Sir W. Watson.

*[2] Guiseppe Piazzi 1746-1826. Induced Viceroy to build Palermo Observatory. Prof: Mathematics at Palermo 1780. Cat: of Stars. Discovered Ceres 1801. Instigated Public Education in Sicily.

x[3] "Cacciatori has 4 children. His wife a slatternly-looking young woman.

x[4] Piazzi himself returned to Palermo in 1821 and writing to J.F.W.H. says: "I shall make every possible search after those papers that were taken away in the plunder that took place in 1820. If I can recover them I shall be able to send an Appendix of some other stars."

(which is bad) the limb rubbed to a high state of polish, and the divisions thereby not improved.
June 21. - Palermo. 1.25 a.m. Dew 56°.1 etc. Good Observations but running an enormous quantity of my abominable Ether. Beautiful calm clear starlight.
June 21. - 12.50 noon. Air 80°F. 10 p.m. Heat insufferable. Found a great oppression and difficulty of breathing as if too much excited, an exalted state of the system perhaps due to sirocco, perhaps to incipient fever."..... He sent James to get things together to bleed him, but the motherly English landlady came up to his room to restrain him. She held up before him the fate of one, 'Harris', who died in her inn from being bled after malaria. Herschel allowed himself to be persuaded..... "Kept still and brought up sketch and journal and letters to date." ... Replying to his mother he says: "Poor Byron![+] Your letter gave me the first news of his death. When he went to Greece, I thought he went to look for death, but I was in hopes he would have found it at the head of a Greek Legion in the cause of Grecian Liberty, perhaps at Thermopylae. That would have been a glorious retrieval of character. But his present end brings to my recollection, his own beautiful verses for the death of a young friend, who died at Cintra of a Fever:

"But thou ... unhonoured, to descend in vain,
While glory crowns so many a meaner crest ..."
Childe Harold, Canto I. x[2]

June 22. - 9 a.m. Presented letters of introductions to Ferrara, and also found Scena at home. Dirty, yet has taken the pains to reduce meteork Observations for 20 years at Observatory. Scena seemed much out of humour, because I was a little behind my time. The true reason, however, was my having made an appointment with Cacciatori (whom he hates and persecutes) to make some observations together on Monte Cuccio. From Scena's drove to Observatory. Saw Piazzi and showed him hygrometer." In spite of this busy day, Herschel set off that night at 7 p.m. to explore Sicily, for after his first taste of sirocco in a sub-tropical climate, he wisely took the advice of his guide in arranging times and distances. The party was made up of Herschel and James with all necessary instruments, led by the guide Carmelo Cataloni, and Giovanni in charge of their four mules. But first he had arranged to climb Monte Cuccio with the Cacciatori brothers. They started

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x[2] J.F.W.H. to Lady Herschel.
x[+] Lord Byron 1788 - 1824.

in brilliant starlight, the mules stumbled and plunged up the horrible road in the darkness. At length on the black hillside, the lanthorns of the Cacciatori party flashed out ahead. Herschel caught them up only to find that one brother had missed the path. During the blind hunt for him, Herschel and the rest lay wrapped up on the ground, they to sleep, he to watch bright meteors overhead.

This bad blunder made it 3 a.m. before they reached the hut, and a violent wind sprang up. Took shelter and rest, and warmed up by lighting up a suffocating blaze with straw before the final ten minutes' climb to the top, (the 'cima'). At last, there below in the dawn, stretched a superb view of Palermo touched by the sun as he rose behind a cloud-bank over the Mediterranean. In sight of the Observatory 4,000 ft. below, they set up the instruments to make their Observations for Terrestrial Refraction, then breakfasted "in situ" above tracts of pink rhododendrons and beneath pure blue sky and climbed down at about 8.30 a.m. Here the party separated, for Herschel had to jog away 30 miles to the S.W. for Segestum. "The greater part of ye island consists of wild arid wastes overgrown with dry thistles and thorny plants where now and then, only a sulphureous and brackish spring makes the scarcity of water more severe and where ye pestilential nature of ye air strips the plains of their inhabitants and drives ye peasantry of ye country to herd in Mountain Villages and leave ye land below a solitude - indeed a desert. From the noble remains of ye Temple at Segestum, not a cottage can be discerned and hardly a tree or anything green. It stands surrounded with dry thistles in ye bosom of a lofty hill. On an opposite mountain is an amphitheatre, while the space between, where once stood a flourishing city, seems as if the voice of man had never been heard there. The gigantic ruins of Selinunte in like manner, lie in a dreary solitude, infested by the Malaria. By ye sea-side, a passing sail in ye offing now and then reminds one that there is a world without, full of life and activity, which else one might forget in the dream of other times and in the dead silence of the scene. Their ruins are indeed most stupendous. The have not been pulled down piecemeal, or stone by stone, but violently overturned from their foundations (literally funditus eversa). In one, the stones and capital of each column lie in their order and in contact, all the same way, and might yet be picked up one by one and replaced."

From Selinunte, the track lay over stony, denuded mountain paths, through Sciacca and by the sulphur-mines near Catolica. Sciacca was a village of discomfort; Herschel's mule showed off in the "horribly paved street" by making: "a sudden spring as if the deuce had got him," which flung Herschel on his back; and the filthy Inn made the night intolerable: "3.20 a.m. Rose, bathed and picked off fleas."

"The Sicilians are a simple-minded, poor, ignorant but very inoffensive race when not in a passion. The intercourse between the different parts of the island is so difficult and rare, that they live in profound unconsciousness that man was born for anything but to eat, drink, provide a successor and die.

"In most of the mountain villages, a practical equality exists, all being poor and ignorant alike, each cottager collects and threshes or rather treads out his own corn which, with snails[x'] (the abundance of which is perfectly astonishing) and wild artichokes, and horrible wine, keeps his body and soul together, and furnishes surplus enough to enable him to buy the little clothing that can be endured in this climate.

Such is the kind of existence I found at Catolica, a village where I put up to see the Sulphur works and mines from which the Sicilian Sulphur and Sulphate of Strontian chiefly come. The temperature at the bottom of the principal mine is 91° and the miners, who work stark naked and bathed in sweat for 6 hours together, are the most uncouth savages I ever saw, yet perfectly good-natured. I got some splendid crystals here."[x²]

In the miserable old Convent of Catolica the plague of fleas was just as terrible; hardly an hour's doze to be enjoyed through the clear starlight night on account of "the insufferable heat, the barkings of dogs and brayings of mules," and he thankfully rode away following the coast line till he turned north near Molo di Girgenti (Empedocle). There, the long drag up to Girgenti took them past the bold orange-coloured bluff crowned with the ranks of Temples some lying as they fell smitten by earthquakes, others standing ravaged by Carthagenian conflagrations. "The ruins of ancient Agrigentum stand now far aloof from the modern town, which has retreated from ye pestilential

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x' Noted at Segestum: "Dry thistles covered with thousands of small snails of which in 5 seconds, James collected his handkerchief full. ... In the holes of the Pillars lives a small snail very clever at esconcing himself."

x² J.F.W.H. to C. Babbage.

influence of ye air to ye summit of a hill 2 or 3 miles off. It is incredible what an awful air this circumstance gives them. One must be on ye spot to feel its full effect. It seems as if they were preserved as monuments of wrath - as if the curse which desolated, still clove to them and caused them to be at once admired and shunned. It is indeed the beauty of desolation, for finer architectural remains can hardly be imagined."x

At Girgenti, he had a long sleep before dining and then passed down the hot silent street to sketch among the Temples whilst Girgenti took siesta. Darkness fell before he climbed up again to find a lively town "all bustle and enjoyment and a Billiard-table very busy. The shops filthy in the extreme." Politi called upon him and boasted of his private theatre "where, as he says, he occasionally hires actresses from Naples at 2,000 ducats a day. Which must be false!"

On the ride to Palma, the short Sicilian twilight enraptured him. "After sunset, blue sky, bright stars, cool air, grasshoppers like distant bells, sea melting into a mist. Dead calm. Young moon." And so in the darkness, they were guided to Palma by the strong smell of sulphur ammonium drifting from the works outside the town. Beyond Palma, the coast land became less desolate. He bathed and watched peasants treading out the corn before he drew rein at Terra Nova: "There is a kind of sub-respectability about Terra Nova, but it is much abated after staying in it 5 minutes, the people squalid and the coffee-houses about equal to a tolerable gin-shop in London. The old hag who presided, would not let me have my coffee cold. Ices here however, very good. Indeed snow is as common in Sicily as bread."*

From Terra Nova to Caltigarone is a five hours' mule-ride up mountain paths. A sirocco, which tends to nervous exhaustion, blew hot and parching all the way. His notes became fretful: "Caltigarone is the noisiest place on earth, a continual clanging of the church bells and dinning the whole day. All sorts of excruciating noises going on all the while, an infernal military band with a trumpet ½ note out of tune, a church clock which struck 50 or 60! and a scoundrel scraping a vile fiddle under the window." He added a thumb-nail sketch of a Church dignitary who: "rode through the market place on mule-back in a red or plum-coloured or moreen coat, purple mantle and green silk hat, followed by a priest in black with his usual cocked-hat, and a servant in blue livery turned up with silver. The people as he passed, took off their hats." The noise increased when a four-wheeled carriage, "the first thing on wheels seen since quitting Palermo," rattled by. Then the last straw to his frayed nerves at 11 p.m. "Sabine's barometer again broken!" And this, in spite of Herschel's calculated disposal of it into the charge of Carmele, who should be less likely to be thrown by his mule than James, (already encumbered with one instrument), or than himself on his skittish mount. Small wonder that in the letter to Prof: Pfaff dated from Caltigarone, he excused himself from entering into a minute discussion on star clusters, being "at a distance from books and involved in the details of a long and fatiguing journey."

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x' J.F.W.H. to Sir W. Watson.

*" "Snow in summer all supplied from Etna, also sent to Malta."

However, next day, descending the hills in the first dawn at 2.35 a.m., they rode into a flood of splendour: "Our first view of Etna from whose summit volumes of smoke were rolling! It cuts against the sky, and the smoke fading away with a light N. breeze, is very beautiful. Both flanks of the mountain are studded with craters." A long day across, "lava of scoracious appearance" brought them to Catania, and at 10 p.m. Herschel went to bed "half-dead with fatigue".

At Catania on July 1st he made the announcement to his Mother that "having now reached the furthest point of my journey, I propose, as soon as I have ascended Etna, and seen all there is to see in this strange out of the way part of the world - to turn my steps homeward" ... July 3. - Catania. I found at Catania, two very estimable men, Carlo and Mario Gemellaro, brothers, to whom I am indebted for much attention and for every assistance in making corresponding observations, etc. in my ascent of Etna. ... Delayed dreadfully by the mules not coming. - A man being hanged this morning for murder, and no man or beast allowed to leave the town by a police order, "for fear of some revolution." At last at 8 a.m., Herschel and James on 2 mules, with a little boy in charge, set off for the top of Etna, via Nicolosi, a village in the middle of vineyards and black volcanic dust where the Gemellaro's lived and had property. "Serra Perrota which belongs to Gemellaro, is a cone coming to a point with an obelisk on the top." "Passed the time pleasantly with Gemellaro."

X 10872-ff

Referring to this 30 mile scramble over lava and volcanic ash Herschel wrote later on to his mother: "We are both thinner, for Sicilian diet is but poor; James complained sadly to me one day, (we had travelled all the morning and found it necessary to remain four or five hours in the heat of the day in a miserable house, full of all sorts of vermin) - when all the dinner our guide could set before him, was a dish of boiled snails, and the internals of a sheep not over clean! I shall never forget the heat of that day. In the coldest place that could be found in the house, the Thermometer was 84°.

"It happened unluckily to be a place of particular interest to me, being situated in the midst of the Ancient Lavas of the extraordinary volcanic district surrounding Etna, and I had no choice but to give up the examination of one of the most remarkable features of the country, or encounter the noonday sun.

"Therefore, off I trudged with my hammer and bag and was amply rewarded for a good broiling by some of the best minerals I have found."

2.30 p.m. En route, with 2 additional mules and beds, and a guide from Nicolosi over a waste of hot volcanic dust and ashes," and under a blue sky and blazing sun. "The Volcano is upon a scale far exceeding Vesuvius, being in fact, nearly three times the height, and is extremely active. The vestiges of its fury are visible in all directions - All the upper part of the mountain is composed of ashes, scoria and ragged lava - the middle region is thickly wooded with fine old oak and green with fern, putting me in mind of many parts of Windsor Forest, but the woods are intersected in every direction by vast black rugged mounds, which at a distance, look out above the trees like piles of fresh earth recently thrown up from some great excavation, but on a nearer approach, are found to be composed of huge masses of excessively hard shapeless and vitrified stone. These are the Lavas of successive eruptions which have burst from craters at different heights on the flanks of the mountain and rushed down burning their way through the forests, and precipitating themselves on the vineyards and towns below. The desolation they make is truly terrific - all the lavas of Vesuvius would hardly make up one of the streams which we skirted for several miles."* 5.20 p.m. Grotto Inglese. Set up instruments and sketched. 6 p.m. The last trees, about 250-300 ft. above the Grotto. 6.45 p.m. A drift of snow preserved by cinders. 7.10 p.m. In sight of crater. Smoke gilded by setting sun. 7.14 p.m. Shadow of mountain projected into air before it (sunlight) had quite quitted here. 9.15 p.m. Casa di Gemellaro over a long, desolate, scorched slope, knee-deep in ashes and snow tracts extending for about 5 miles. It is a house of some size, and has chairs, tables and bedsteads. Here I passed the night (a glorious starlight one). Bar. 21°307. Water boiled at 194°F. Examined the Milky Way with my Dolland .. stars do not twinkle except very far beyond meridian.

Sunday, July 14th. - 1.30 a.m. Perfect calm. 4.26 a.m. Sunrise over Calabria, Cap Spartivento, Straits of Messina. 5.15 a.m. En route for Great Cone.' 7.0 a.m. Cima di Etna involved in clouds of Sulphureous and acqueous vapour. Temperature of air not to be had here for steam and heated soil; almost suffocated.*' Came down again to Gemellaro's Casa Inglese[ø] from which scrawled a few lines to Babbage. "Casa Inglese.' 1.30 a.m. I am writing to you very comfortably from Gemellaro's hut on the top of Etna with my guides snoring in an adjoining room, and a formidable apparatus of instruments and eatables beside me. I brought up a bed but it is full of fleas and as there is no rest to be had, and the night is beautiful, I shall divide my time till daylight between my instruments and my friends." 10.7 a.m. Left (Casa di) Gemellaro. Air darkened by clouds of cinders blowing over the ashes. N.B. Vapours of Etna collected by Gemellaro and given me by him. Not the least cloud with nitrate of silver. No smell nor taste. Appears pure water. Collected in a tin alembic lead....."It is thirty miles from Catania to the top. The road desperately bad for the Mules, which however, can go (and did so in our case), as far as the Casa Inglese - after which the rest of the ascent must be performed on foot and a toilsome business it is. I thought James would have fainted once or twice from the difficulty of respiration in the thin air of this elevated situation.

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x J.F.W.H. to Lady Herschel.

x' J.F.W.H. to his Aunt. "Next morning mounted the Crater by a desperate scramble up a Cone of lava and ashes about 1000 ft. high."

*' "Everywhere are small fissures out of which come steamy sulphur gases, almost suffocating ..." Ivor Manley 1939

ø' Casa degli Inglese', built as an Observatory in 1811 by English officers during Napoleonic Wars. Burnt out in 1862 and present building erected.

and the difficulty of the ascent up a heap of ashes and cinders, I was not much better off, and the long descent to Catania completely exhausted us both. But to-day, all toil is forgotten and we are both fit for another such excursion."x'

...."I took up an excellent Barometer (the same I had with me in Switzerland), and having set two scientific gentlemen to make corresponding observations, one at Catania, the other at Nicolosi (a village about 10 miles from Catania on ye flank of ye volvano) have obtained data for a very exact measure of its height, which however, for want of tables, I have not yet calculated."[2] It was puffing out volumes of Sulphureous smoke and there was no descending into ye crater any more than into that of Vesuvius which I also visited from Naples[3]....

...."At Catania I met an Abbate who has discovered some Sulphur Crystals, which he says are not derivable from the Octohedron, but have the hexagonal prism for their primitive form. I suspect he is wrong, but I am not Crystallographer enough to prove it, but if he be not, it is a curious confirmation of Mitscherlich's discovery of the two primitive forms of Sulphur. I have got one of the Crystals, which I shall get Wollaston to look at before I send it to Mitscherlich.

"The volcanic country about Etna is extremely curious, and deserves a minute examination. The modern slags with imperfect crystals of Felspar? forming granulations - and on the mountain nothing else is to be found - for Etna does not, like Vesuvius, throw up a variety of unaltered minerals and rocky fragments - one or two lumps of granite have been found, but its staple commodity is lava and the dust of lava. The remarkably uniformity in the character of all its lavas ... and this occurrence of granite (rare as it is), among the ejected matter, make me suppose that the seat of the fires of Etna lies at an immense depth among the granite, and far below all the superimposed rocks. The older lavas appear to have flowed before the present mountain existed ... Near Catania, are some old lavas which form insulated masses in the sea

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x' J.F.W.H. to Lady Herschel.

[2] He eventually announced the height of Etna to be 10872½ ft. See J.F.W.H. to S. Hughes, Jan.15, 1830.

[3] J.F.W.H. to Sir W. Watson.

opposite the little town and Castle of Aci - they are called the Isole dei Ciclopi, and have all the appearance and form of basaltic columns except the joints, which have no convexities and corresponding hollows like those of the more regular Basalts. I have taken some very exact drawings of them."x'

From Catania he hired a boat & landed at Castello d'Aci on the first little shoal close to shore, [illegible] On promising the seven men an odd half piastre, "they cried 'Viva, viva', and pulled back like devils to Catania" and next day in high good humour, rowed him over to the Islands, the sun just rising over the batteries and a distant firing heard from Augusta.....

July 7. - 3.30 a.m. "Left Catania to return to Palermo by an inland track past the salt-mines of Alimente." Over these rocks, he shared desolation and thistles with a Count Beffa Negrini of Mantua who caught him up, for (to avoid the scorching heat) they had both started at dawn. Beffa too had a large hammer and bag. The sun glowed red through the smoke of Etna, and two palm trees stood out sharp against the sky. Herschel remarked: "We are the first strangers for 6 years who have passed through this place." He had just previously noted that a little servant of the Sindaco at Catena did not even know what to do with a tip, but ran with it to the Sindaco who instantly "forced it back on the donor, Count Beffa." ... With James & the pack horses, the two then jogged away past cornfields where the threshing is performed in the open by a string of horses and mules driven at a trot to tread the corn to pieces, and men throw it up in the air to winnow. This way cut off the N.E. corner of the Island. In the twilight, they stumbled up over the Col of Catena and from there, gazed back on the glow of stubble fires and the gloom of Etna beyond it all. Next day, from a hill ("where lime and sandstone abut in two sets of strata at right angles to each other") they halted & saw before them Termini far away on the coast, & looking back, saw the eastern sea shimmering in sunlight. They only had one more night of barking dogs, "too bad to bear". A good coast road brought them the last 25 miles into Palermo, via La Baghiera, a palace of the Prince of Malaguarde. Entranced by the exquisite views in the garden Herschel stopped there the greater part of the day and then found Palermo..."so full that I thought I must have gone back to Termini, but with some search discovered an apartment - neat enough, but small. Poor James was very badly off here for the hens had established

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x' J.F.W.H. to C. Babbage.

themselves in his bedroom, the consequences of which on his nightly comfort may be conceived."...

The festival of St.Rosalie of Palermo was unusually gay this year, owing to the arrival of Maria Louisa, Archduchess of Parma. The Fête commenced with a Morning Mass in the Cathedral on the 11th. In the evening of that day, the Car of St.Rosalie like a moving mountain of gold clouds, angels and silk, began its course from the Lower end of the Toledo Street to the Cathedral at the upper. Twenty-four horses with white plumes struggled along with it, four abreast, and made a stop at every ten or twenty yards, when the sound of a band of thirty or forty musicians within it was heard. As it passed along the Toledo (a street of great length and considerable breadth), the Saint from under her canopy looked in at the windows of the fourth storey, and filled the whole breadth of the street from one side to the other with the bulk of her cloudy vehicle!

On the second day came a Race of riderless horses, (called the "Corso di Cavalli"), down the whole length of the Toledo with bladders tied across their shoulders, and goads, (little bunches of pins, points outwards) dangling about them from patches of leather stuck on to them with pitch. Frightened by the bladders, stung by the pins, and driven forwards by the noise of cannon and the shouts of the people, these poor creatures rushed like lightning along the slippery pavement. // During this event, Herschel's more sporting friends had some hopes of him. They covertly watched his intense concentration on the winning horse. Alack! it was not for the money on it. He merely compared the gallop of the horse with the tick of his watch to compute the creature's m.p.h.! In the evening a "General Illumination.— "The effect", writes Herschel, "along the front of the town towards the sea, was the most splendid thing I ever saw. For near two miles, it was an uninterrupted blaze of lamps. After dark, a huge firework was let off - "Mount Etna in a state of Eruption" - and the noise and fire were really tremendous. Whilst all this din and smoke and hissing and sputtering of rockets and squibs was going forwards - the sweetest full moon - in a sky without a vapour and without a breeze - was sleeping over the motionless glassy sea and the fine amphitheatre of mountains."

Herschel spent a week at Palermo first carefully secured a passage for Naples in the steam-packet. She was still an exciting novelty, indeed "in the evening the Steam-packet made the circuit of the bay loaded with passengers at a Dollar a head, and steamed between 2 frigates lying in the Harbour there."

Everyone at Palermo helped him to pass his time agreeably. In duty bound, he called on the Consul, Mr. Welsh, and then his new acquaintance, Count Beffa, called at 6 in the morning to visit the Observatory and in the evening, Cacciatore took him to the house of Mr. Taunton, "a substantial hospitable English merchant, 18 years resident here, who entertains all the English of tolerable respectability."[x'] There, from the sea-terrace, they witnessed the fireworks and here, on another occasion, he dined to meet Dr. Daubigny whom he had already run into at Catania, armed with a hammer and a bag. After this dinner party, the two scientists went together to call on their mutual acquaintance, Count Beffa, and made their entry into Sicilian society at the house of Prince Cuto. Finally, as Herschel wrote to Babbage: "The Empress Maria Louisa is here. Go where I will, I am sure to find her." He dined one day at the Observatory with Piazzi, who had recently resigned the position of Astronomer in favour of Nicholas Cacciatore ("the most reasoning, business-like person I have seen in Sicily or Italy either, Plana excepted). Present: Cacciatore, Ferrara, The Intendant of Marine, (who stated the greatest difference between high water and low water here to be 3 ft.), A gentleman. who had been in Egypt with Bonaparte, 2 young Austrian officers."

Herschel continuously maintained his entry of daily meteorological data during his journey.[x²] This involved many pages of detailed notes, e.g. "On comparing my Barometer with that at the Observatory at Palermo, I found (after all reductions), that it has not undergone the slightest perceptible alteration during the severe trial it has suffered in travelling near 500 miles over the almost impassable roads of this country."

Another day, he has the entry: "10.55 p.m. Exposed thermometer on roof. Wind enough above the wall to blow out my candle and I nearly broke my neck down a broken rotten ladder getting down." Or again: "Thermometer 83°. The sense of heat and moisture intolerable. A bottle of water fresh from the well at 65° runs down in streams."

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x' J.F.W.H. to Lady Herschel. "I shipped a Hogshead of 'Lacrima Christi' yesterday consigned to London."

"[x²] Actinometry. The direct heating power of the sun's rays may be measured ...dynamically... The first attempt at obtaining such a measurement, so far as we are aware, were made by (J7WH) in...Sicily in 1824. A glass vessel full of inked water was exposed alternately 5 m. in sunshine & in shade etc. } Extracted from the article Meteorology by J7WH in Encycl: Brit. 1856.

Even under the influence of a beautiful sunrise, his notes remain dispassionate:

"4.41 a.m. A most glorious sunrise.
4.43 a.m. The sunbeams have no warmth.
4.47 a.m. They feel sensibly warm to the hand."

On July 17th, Count Baffa very politely came aboard at about 11 o'clock to take leave of Herschel and Professor Daubigny on the steam-packet for Naples.

"July 18. - 4.45 p.m. Brought to at Naples, and then (after a long and vexatious formality with the Douane) came home. (Daubigny was strictly searched and his pistols taken away, because he had not a permission to bear arms). Being quite giddy, went out no more. Made up accounts. My Sicilian trip has cost (nett expenses) about £51.

July 19. - Naples. Called on Monticelli with Daubigny and spent 2 hours with him. Rode over to Sir W.Drummond, where met Sir William Gell.[x'] [x²] "Sir W.Drummond is a valetudinarian. Came here apparently to nurse. The situation of their house ... is most beautiful. Vesuvius seems to overhang it and the mountains of Sorrento and Castellamare with the Isle of Capri - the Bay - Ischia, etc. sweep in front. From the terrace, a broad rich belt of vineyard slopes quite down to the sea. Extreme transparency of atmosphere this evening. Every house on the hills of Sorrento and Castellamare distinctly seen. The minutest lines in the mountains ditto. The Cone of Vesuvius seemed to approach as if one could touch it, so sharp its outlines and figure. A light on Capri seemed like a lamp in a window a quarter of a mile away. Sunset. A rich purple glow on the cliffs down to water's edge below Castellamare. Everyone present declared it uncommon, even in Naples. - Lightning - Evening remarkably cool, even chilly. Returned, looked in on Daubigny who has a touch of fever and could not dine with Hamilton. 10.10 p.m. Obliged to shut my window to avoid taking cold.

July 20. - Just at sunrise, Thermometer 67°. "It is said there was a slight earthquake yesterday, but I suspect it was caused by the firing of guns for the birth of the Duchess of Calabria's 12th child, for which the town has been kept in an uproar all day, and a blaze of lamp-light all night." [x'] Daubigny worse.

July 24. I feel very unwell, restless and feverish this morning, I could settle to nothing. Called on Hamilton. Met there Monticelli and Milligan. M. trumpeted the praises of Sulphate of Quinine in malaria. There is an enormous consumption of it in Calabria. Millington arranged to call for me at 3.30 to go to dinner at Lord Blessington's at Belvedere. Accordingly, at 3, I was dressed and lay on my bed waiting for him and at 4½, he came with Strangways. — Lady Blessington's character of Lord Byron.— He took leave of his friends for Greece with a presentiment he should not return.[x²] After dinner, paraded the Terrace, and enjoyed the unequalled view, and then descended into the garden which joins with the Royal Gardens of Belvedere in which is the enormous bridge, so conspicuous from the sea, over a Ravine in the hill side. Entered there and crossed the bridge. Returned - a delicious evening. Lady Blessington wanted me to join a party for next day to Isle of Capri. Obliged to decline, too ill. Lord Blessington, when I said so, observed: "This is a country where a man is alive and well to-day, and dead to-morrow!" Recommended Roskilly.[x³] Returned and immediately went to bed, and passed a night of fever.

S. July 25. - Attended by Roskilly. N.B. In fear lest I should have got an attack of malaria. He gave me an emetic and at night a sudorific. Passed the day in bed.

July 26. - Fever abated in great measure, but unable to sit up. Fainted in the attempt. Brioschi (from the Observatory) called in this evening.

July 27. - Took more physic and rose extremely weak, but fever abated. Pulse low, etc.

July 28. - Pulse 48. Very weak and low, but ate part of a boiled fowl with Daubigny, who is now almost recovered (not a little petulant)." — Doctor Daubigny and I have arranged to travel together, at least to Florence or Bologna ... He was 3 months (? weeks) in Sicily and was

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x' "In May 1824 ... the (Blessington) party had just returned from a fortnight's excusion accompanied by the renowned but ludicrous archæologist Sir W. Gell who with magnificient pomposity acted the learned cicerone when Lady Blessington visited Pompeii".
(Blessington-D'Orsay by M. Sadleir.)

x² J.F.W.H. to Lady Herschel. "Your Cambridge acquaintance, Sir W. Gell."

x' J.F.W.H. to Lady Herschel.

x² See above p.228

x³ "I never saw the milk of human kindness overflow in any nature to so great a degree as in Lord Blessington" (A remark by Lord Byron.)

never still a moment. By the great exertions he made, joined to the excessive heat, we had hardly reached Naples when he sickened and took to his bed ... If the Doctor is well enough, we shall go on together on Monday." x' ....

"Thursday, July 29. - Pulse still 48. Dined with Dr. Daubigny, and commenced drinking wine. 6 p.m. Set out for Belvedere which reached (drawling) at 6.50." .... "Lady Blessington (the facsimile of that beautiful portrait of Lawrence's, but if possible even more beautiful than her picture), is as pleasing as she is lovely x² Her conversation is lively and brilliant - she rather shines too much and is a little inclined to be satirical - but her satire is not ill-natured - and she throws her whole weight into the scale of good feeling and good senses, and is only unmerciful when these are attacked ... You see, I keep up my gaiety here, and shall do so to the end of the chapter, for I am engaged to dine at Mr. Hamilton's (whose attentions have been uninterrupted), and to-morrow I am again implicated in a party at the Belvedere." x³ "Attended Lady Blessington to Observatory. Brioschi very attentive, brought out the large "Frauenhofer" of 7¼ ins. (French) apertures and 9 ft. focus, but so horribly mounted (all in a swing with 6 counterweight) that there is no getting or keeping it on a star. With much difficulty saw Arcturus in it, (not a disc - but a star of 3rd mag: had an ill-defined disc with 200). It has a clockwork to follow the motion of the star, but bad. There are 2 similar and a 3 ft. Repeating Circles by Reichenbach, apparently very fine instruments, one in each dome, these are the Altitude Circles. The Azimuth Circles are 2 ft., they stand on oblong columns carried up to the top of the building. (On either side of the Azimuth Circle) from the flat of the column on which each instrument rests, rises a pillar of marble. These pillars support the frame

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x' J.F.W.H. to Lady Herschel, July 29th.

x² re Lady Blessington: "With a tact unsurpassed she contrives to draw out even the most modest tyro from his shell of reserve." W. Archer Shee.
"I always left her with a sense of enjoyment and a perfect disbelief in everything I heard to her discredit."
Mrs. S. C. Hall.

x³ J.F.W.H. to Lady Herschel, July 31, 1824.

of wrought iron, which holds the upper end of the vertical axis. Returned to Belvedere and took tea.
July 31. - Dined at Hamilton's. In evening, rode out to the Margravine of Anspach's house on the Strada Nuova, where Mrs. Hamilton had a tea-party, on a hill overhanging the sea in the midst of a vineyard.
Aug. 1 - Dreadful heat. James complained much. James worse, made him take an emetic.
Aug. 3. - 11.5 a.m. Quitted Naples by Courier, leaving James to follow by the next.
Aug. 5 - 4.25 a.m. Post Office, Rome.
Aug. 6 - 6 a.m. En route for Tivoli. 4.30 p.m. Left Tivoli, which after all is much less striking than Terni. 4.47 p.m. Turn to left to Hadrian's Villa, admitted after a long and violent knocking at the gate. Surrounded by a wall and hedge, kept neatly trimmed by Cicerone, a good-natured peasant who lives in the belonging (with all this!). 7.24 p.m. Drive across Campagna by moonlight, Desolate, lonely road, not a soul seen till close to Rome, which reached about 10 p.m.
Aug. 7 - Rome. 5.30 a.m. Wakened by James, who arrived by the Naples courier this morning. Thermometer 69°. Delightfully cool and pleasant at this hour. N.B. The range of shabby old buildings in front of St.Peter's separating the two streets (Vecchia and Mioca) which lead up to it, should be pulled down. Note: Perfect cleanliness and freedom from bad smells in all ye streets of Rome. Called on Scarpellini at the Umbrian College near the Via de' Cesarini, whom I found at home (though denied by his servant in his presence) in his shirt, over his coffee. Remained with him 2 or 3 hours and talked much. His hobby is in collecting instruments (he does not talk much of using them). He has a good lathe and dividing engine, and has made a very respectable quadrant on a vertical axis, with all the adjustments and divided in centesimal degrees and twelfths (so that it can never be much used.) A pyrometer of a very delicate construction and a gridiron pendulum constructed by it, and then tried by it! and found invariable!! Boiled down some of ye water of the Aqua Solfurea, (obtained from Tivoli). As it evaporated, a scum collected on surface which dissolved with effervescence in Nitric Acid and is carbonate of lime. Gas escapes during this deposition. After ebullition, ye water is nearly

tasteless, because its bitter taste when fresh, is merely owing to ye sulphuretted hydrogen and not as I suspected to hyposulphite of lime.
Aug. 11. - 4.50 a.m. In a beautiful moonlight twilight en route from Rome. 5.15 a.m. The most beautiful of skies, not a leaf moving. In West, the yellow glow on the Sabine hills, to the left the sweet full moon, hovering over a vapory bank of the richest purple, trembles (reflected) in the stream. Every spot on her orb may be traced as in a map. Yesterday in the same atmospheric conditions, noted the same rich, ruddy, purple glow in the Western horizon, while the Eastern is of a fine yellow. To the S.E. it is ruddy orange approaching to brick red. Last view of St. Peter's under Monte Mario. The Campagna this way out of Rome is broken into deep dells, which are full of wood and verdure, and is by no means dreary though deserted. Soil, strata of volcanic earth-ashes and fragments. The oxen have immense horns and a very strong rope is passed from the tip of the outside horn to the root of the inside horn, and thence to the splinter bar of the carts, they are guided by an iron ring through the gristle of their noses. 7.30 a.m. The Postillion here turned the 3rd horse loose to take his chance of finding him on his return. 9.4 a.m. Monte Rossi. 9.20. A small lake, after which descends rapidly on the lava hill. The postillion says the water of this Lago di M. Rossi is very deep, and it has much the appearance of the Crater. The Tufa has recommenced. (Verified). We left lava at descent of hill 200 yards before 27 mile stone, at a point distinctly marked and no doubt, therefore, remains that the lake of Monte Rossi is ye old Crater.
Aug. 12. - 4.30 a.m. En route for Terni. 8.15 a.m. Top of the Pass near Papizona, which is said by the Postillions to be infested by a band of 17 banditti. "Ci è grand brigande qui!" He says an English family was robbed here a month ago, and pointed out their nest, an old ruinous place, on the top of a high peak. 12.40. Descended to Spoleto. 1.44 p.m. After getting about 1/3rd drunk, with very 'so so' wine, and enjoying for an infinite space of time, the most magnificent visions it is possible for man to conceive - in short, existing intensely, made my observations, and locked my door, and went to bed. 1.50 p.m. Noted with curtain drawn, 92°.1 Bar 29.147. Gave order to James: "James - in 1 hour from this time, make a row about the horses" - Then en route for Foligno.

Aug. 13. - 2.2 a.m. Left Foligno for Perugia. Bright cool moon, and starlight. Road excellent.
2.35 a.m. The ruined Amphitheatre on left, very distinctly traceable ½ or 2/3rds of its circumference. Met a patrole well armed and mounted.
4.28 a.m. Dawn - pretty bright in east, light yellow with a greenish tinge. Thermometer 61° no dew.
4.45 a.m. Therm: 64°.5. In East tinge, Brick red, Pale ruddy yellow, pale greenish white, pale blue and deep blue. In W. sombre, a tract of purple.
4.55 a.m. Very pale orange and pelegal (? purplish) white and little inclined to pink, purplish blue, blue in E. - In W. somewhat blue with hardly a perceptible tinge of purple.
(Another nasty high-pitched bridge).
5.6 a.m. The ruddy glow is over, a bright yellowish white down to the horizon N.W., at 5° alt: a faint purple.
5.10 a.m. A decided purple blush, in W. sombre, purple, white, blue, are the tints upwards. No stars visible.
5.15 a.m. Fine purple in W. N.B. It is not complimentary to ye Eastern tint, but in fact is a continuation of it coming round from N. & S. and meeting in W.
6.18 a.m. It is now very rich and borders on pink.
(5.25 a.m. Oxen put on to ascend hill of Perugia.)
5.32 a.m. A bright broad orange yellow glow announces the approach of the sun.
5.35 a.m. Upper limit visible, and the whole horizon in a flame.
5.27 a.m. Lower limit of sun visible and whole horizon in a flame.[x']
6.10 a.m. Enter Perugia creeping slowly up its tremendous hill. 6.55 a.m. Left Perugia. Postillion's horse reared and fell with him, and in rising fell again, but he kept his seat, and was but little hurt. 11 a.m. Passed the Papist Douane with only a formality of signing passport. Sandstone begins to assume a slaty character, and also occasionally a calcareous one and slaty limestone. 5.20 p.m. Post house of Castiglioni. Detained here by fracture of one of the laminae of the spring. 9.35 p.m. Arrived at Arezzo (After 'Gates').[x²]

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x² See above, page 127

x' Herschel's Article on "Light" Op.58 was published in 1826 in the Encyclopedia Metropolitana. The above notes on dawn-colouring explain his ejaculations in the opening paragraph of that treatise.

The change from the Neapolitan to the Roman manners is striking enough, and the improvement material; whilst in the journey from Rome to Florence, the change is still more striking and satisfactory. An immense polish of manner, a marked increase of personal beauty, and still more visible improvement of intellect as far at least, as the little occurrences of a 5 day journey allow one to see. The postillion who drove me here and the guide at Terni, are both reasonable animals, decidedly rational bipeds. The waiter at the good Inn, "Locanda della Posta" here (Arezzo) is a model for his profession, attentive, not obtrusive, nor officious. Not like a Neapolitan servant, stopping you in the midst of your orders with "Capisco"! "Siete tranquillo"! - "Penso Io"! - and then running away and never thinking more about you. Nor like a Roman one running to execute half your order before he has heard the other half.

From what I have hitherto seen of Tuscany, it is a gentlemanly nation. There is a public, and a regard for character, and respectability in its eye.

In Rome, every man is independent of every other, and there is only no feeling one way or the other.

In Naples, there is a mob-public, the feeling is positively <u>against</u> respectability, and even against common honesty.

In Sicily each town, nay, almost each village, has peculiarities, <u>national</u> feeling does not exist, individual personal sentiment is everything and to talk of a <u>public</u> or a <u>general</u> sense of propriety and impropriety in a nation where in all the most ordinary transactions of life, one has to commence <u>at 000</u> as if it was the first time such a thing was ever done, is quite absurd.

Aug. 14. - 5.10 a.m. En route from Arezzo. The Tuscan system of road-making a very dangerous one. The road is almost always elevated above the plain and often, in the hollows of the hills, has a perpendicular descent of many feet on either side. Across the road are deep channels to let off the water, which are paved and formed of 2 planes coming to an obtuse angle. The shocks these give to the springs in going fast are severe, and in fact, broke mine. They are full too, of little bridges, all steep-pitched and without parapets. Also they are encumbered all along with large heaps of stones which render them extremely dangerous to post by night.

9.0 a.m. A very unwholesome system of cultivation in this vale, which happily is confined only to a small portion, a stream of water is dammed, and made to flow over a certain area which it softens, fertilizes, and fills with reeds. Next year the dam is removed, the marsh laid dry, and the reeds are dug in.

3.45 p.m. Florence. Reached Mme. Humbert's on the Lung 'Arno. Lungarno pestiferous, river almost dry and putrid smell arising. Changed my quarters to "Hotel de Paris".

Aug. 15 - Florence. (N.B. James let barometer fall, and broke it! or he and a porter together did so.)

Dined at Mme. Humbert's Table d'Hote, where I met Fuller (one of our Fellows at St.John's). (A cousin of the M.P. Jack Fuller)[x']

Called on ye Marchese Ridolfi (Cosmo). His electrical Machine. Suggested an experiment with it. It lighted amadon (? Amygdol) and also charcoal held by myself. Dined at Humbert's and walked with Fuller to the Museum."

....."At Florence, I found M. Inghirami, the Astronomical Abbe ... and through his means got sight of some very superb astronomical instruments, for which nothing is wanted but an Observatory and an Observer, and they talk of having both."[x²].....

....."There is a glorious <u>Repeating Circle</u> by Reichenbach, 3 ft. diameter.

The <u>Azimuth</u> 2 ft. object glass 3 in: focus 4 ft. Prismatic eye-piece permanently adapted with the prism of great size and large limb. N.B. The interval between the interior and exterior vertical circles, seems larger than usual, and too large. The circles and their radii are cast in one piece (not hammered?) but turned down 1/30th inch. When mounted, it will stand between two marble pillars about 5 ft. high, with a crossbar at top. It is counterpoised in every part, the 2 vertical circles are counterpoised separately.

A <u>9 ft. Transit</u> and 3 in: object glass by Sissons and lens by Dolland very strongly mounted.

A <u>Zenith Sector</u> reversible in Azimuth by Dolland an awkward machine.

A <u>Frauenhofer's telescope</u>, 5 ft. focus.

An <u>Actinometer</u> of large size by old Dolland,

and A <u>7 ft reflector by my Father</u>, ye mirror repolished 11 years ago by Amici, and now in a very good state.[x³]

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x' See above, page 94

x² J.F.W.H. to Lady Herschel Aug.15, 1824.

x³ Could this be the reflector bought by Lucien Buonaparte Duca di Canino in 1816?

8.45 a.m. Placed (my) Thermometer and Barometer close to Inghirami's in his observatory at ye "Scuola Pie" (up 8 pairs of stairs!) for comparison. N.B. Inghirami's Observations (meteor) are published monthly in the Giornale dell'Antologia (at Florence).
Aug.17. - 3.15 a.m. Left Florence. At ye gate, the officers made many apologies for the liberty of asking me to write my name. N.B. Had every part of ye carriage thoroughly examined and repaired, particularly the drag for this day's work. 4.10 p.m. Passed, not without a shudder, the scene of our mishap May 1.* Never felt the sun's direct rays more. 5.27 p.m. Pianora. Driven hence to Bologna like lightning along the capital bit of gravelly road. 7.4 p.m. Reached Bologna gate just before sunset. N.B. A most infernal stench in this town.

Cassini's 'Meridian' commences on the E. side of the entrance to the Duomo of Bologna and runs obliquely along (the floor) the length of the Cathedral ... with inscription at the N. end. Brass line ¼ in. broad, down middle of which runs narrow line of copper

The Observatory construction is one square tower on top of another, but 45' turned round as if in defiance of stability.

Instruments: A Dolland 10 ft. object glass of 3¾ in.

A small Reichenbach Transit.

A great many old instruments.

North 15° more or less, but so much iron about here and below that no confidence, or rather no observation can be made.
Aug. 19 - 4.0. Rose. 4.50 a.m. En route geologizing. 7.40 a.m. A formation of Crystallized Gypsum. Monte Potuno and the neighbouring hills are full of it. Therefore look for salt. Returned to Bologna. 4.51 p.m. Left Bologna. Detained a moment at gate by passport, but no douane. (The stench alluded to Aug.17, 7.4 p.m. is caused by the stripping of hemp, and is pestiferous. It resembled the scent of night-soil spread over the fields for which I took it, exalted by the heat.) 8.p.m. Arrived at Modena.
Aug. 20 - Cloudy morning. Called on Amici whom found at his door (with toothache) and had 3 hours talk with him:

(1) He and Plana are going to work together on Polarization; Plana to furnish the theoretical, and he the practical knowledge.

x see Page 216

(2) He has never yet been able to make fundamental experiment with 2 mirrors slightly inclined, and seems to believe it is a fabricated one.

(3) About his method of using a metal reflector instead of a surface of Mercury to observe by reflection.

(4) Nobile's repetition of my experiments and his addition to them. N.B. Nobile has not been fair, I therefore gave Amici the half-corrected sheets of my Bakerian lecture[x'] to give to him that at least he may see what I have done, then let him add more if he will.

(5) Gave Amici my answer to M. Poletti's silly observation against my paper on functions in a letter to Poletti.

(6) Saw progress of my micrometer.[*2] N.B. When I insisted on making at least a return, Amici retorted that he was no artist, like Frauenhofer, and would have no money, but told me I should send him books, etc. (N.B. To send to what I consider double the value and then desist).

(7) Promised to get South to try his micrometer.

Left Modena (in afternoon). The road is raised 15 to 20 feet above the plain, and is capital, and lies across a dead flat to the River Po. Left shore in the Ferry made of two boats with a platform. Heavily laden and very bad to get carriages into and out of. River may be ¼ mile, or less, broad. 7.2 p.m. Arrived on opposite side. The ferry swings across by a long Rope, supported by a line of boats and anchored up the river. 7.40 p.m. Approaching Mantua. The country begins to swarm with Austrian soldiers. Enter Mantua by an enormous massive gate, where detained an eternity by the stupid Austrian guard who puzzled over my Passport (which to be sure was enough to puzzle the deuce), till he gave it up for a bad job and came and took my outline at the carriage door ... Enclosed Count Beffa's letter to his brother not having time to call. Muskitoes! Horribly annoyed and bitten by ye muskitoes and put to absolute torture by violent erysipelas in arms and hands, and forced to keep them half the night plunged in cold water. Slept at Mantua.
Aug. 21. - 4.15 a.m. En route for Padua. A most lovely cloudless morning. The road up to Este is a deep flowing

x' "On Certain Motions Produced in Fluid Conductors when Transmitting the Electric Current." See above page 205

* See above page 214

dust, full of broad glistening particles. 4.15 Enter Padua. Aug. 22 - A balloon lays here (at Padua) inflated with a bellows; they are going to send up a dog and a cat with it next month. (N.B. Saw Encke's Comet.) 10.50 a.m. En route for Venice. Many large houses on the Brenta, and a "treckschuyt"* dashing up the stream at a fair trot drawn by one horse. It is a long narrow boat with the forepart of its keel out of water, like a skate (picture). In the middle, an awning of black cloth, which James immediately remarked and asked if it was "a burying". 2.10 p.m. Came full on a fine view of Venice with infinite steeples and towers and 1 large Dome terminating the horizon, and presently reached Fusina. Leave carriage and take boat. 2.55 p.m. Embarked for Venice. The Town gleams with accidental lights (as the Sun plays between the clouds) in some parts and is dark in others. The effect of such a mass of buildings and rising sheer from the surface without the least (visible) line between, is new and singular. As we approach the town, it rains a little, and the town is just spanned by a very low segment of a Rainbow. The effect is magical, and most poetical. Our Gondola is a regular post boat, and the head-man is a postillion with "Posta d'Acqua" on his hat on a brass plate. The sea is of course, extremely shallow, as a row of piles marking our road and the numerous islands on all sides, testify. 3.35 p.m. (Venice). Entered the Town, but not by the Grand Canal. It seems very desolate, not a boat but our own in motion and few people on the footways which skirt the houses frequently, on one side. No rattle of carriages, no noise of voices. Silence like that of the dead. Church of S. Marco. In front the bronze horses (4). Church a most venerable rich and curiously antiquated old building.

("Gazetta di Venezia. Paris 10 Agosto. Il Sig: Grauenhofer, matematico di monaco in Bairera ha terminato un telescopic a refracione per l'universita de Dorpat. Questo Grande instrumento sorpassa in lunghazza ed in diametra il famoso telescopio d'Hershal il quale era a reflexione eche costa a quel tempo 300,000 frs. presso assai maggiore di quella a cui parliamo."*[2] What lies

*[1] Probably should be called [illegible] in Italy.

*[2] "Venice Gazette. Paris 10 Aug. 1824. Sig: Frauenhofer, a mathematician of a monastery in Bavaria has completed a refractor telescope for the University of Dorpat. This great instrument surpasses in both length and diameter the famous telescope of Herschel, which was a reflector and cost at that time 300000 frs. a great deal higher price than the one of which we are speaking."

circulate by these papers without possibility of contradiction!)

Aug. 24 - 9.15 a.m. Attended at Police Office to get my Passport. The Austrian Government requiring personal appearance at Capital towns.

Palace of the Doges. In the Gallery immediately behind (the place of the Coronation of the Doges) are the holes of the famous Bocce de Leoni (the lions). Heads were knocked off by ye French in their wanton mischief.*[1] In the Piazetta before the W. Front of the Palace, are 4 pieces of Cannon with wooden covers, and 2 Sentry boxes and sentinels parade before them. Good God! what a sight for a once proud high-spirited people.*[2]

Mounted Tower of S. Marco. A furious E. wind. Horizon clouded so as to cut off sight of the Alps. In front, the Piazza, and ye Clock of St. Mark, all blue and gold, a gewgaw thing. To E. looked down on the roof of St. Marco and ye bronze horses, which are seen better here than from below. (Best view of ye Bronze horses is from a window in N.E. corner a little above their level, one must creep a little and lie along.) They are not damaged by their trip to Paris. Walked out to the Public Gardens. Gondoliers' song. Every 4 bars comes to a full close in 2 parts, occasionally 3."..."The silence in the town from the total absence of carriages and horses is funereal, and the hearse-like appearance of the Gondolas adds to the melancholy of the place."*[3]....

"Aug. 25. - Breakfasted. Took my Gondola. Called on Banker. Entry of Grand Canal guarded with 50-gun ship.*[4] 4.46 p.m. Left Venice. 5.29 p.m. Fusina. 5.55 p.m. Left it. 9.15 p.m. Padua.

Aug. 26 - Observatory Padua. (Santini, Professor of Astronomy.) A high and immensely strong tower, once a fortress. On top, a smaller tower built which contains the equatorial, etc. Instruments: A Ramsden's Quadrant (1 of his 4 great ones: 1 at Milan, 1 at Greenwich, 1 here, and 1 at Wilna.) 8 ft. Reichenbach: 4 ft. Transit by Frauenhofer and Reichenbach: a clock by Grant, London: 12 in. repeating Circle by Reichenbach. N.B. With this, took the angle (double) between a point of S. Antonio

*[1] These have now been restored.

*[2] Venetia was allotted to the Austrians by Congress of Vienna 1814-15.

*[3] J.F.W.H. to Lady Herschel.

*[4] Austrian Guard-ship.

and San Guistina. In evening, went again to Observatory to witness the firing of Gunpowder signals, (an operation undertaken by the Austrian Government on Monte Baldo, a hill above Vicenza, for the difference of longitude between Milan and the various observations and stations E. of it). The observations succeeded well. Flash instantaneous and like a bright star. Observed the Comet which is 2¾° S. of g. (Henri).
Aug. 27. - 5 a.m. Quit Padua with a wish to have staid longer. Vino Santo at "Stella d'oro" the best white wine in Italy! Padua is a town of a good deal of trade and manufactury. It is the work-shop of Venice. The people kindly, happy and extremely kind-hearted and good-natured. Santini a good specimen."... "Its University, once so famous, is now deserted and the few students there are left, are subjected to a merciless conscription by the Austrian Government which seems determined to quench the light of science, or at all events, to lend it no aid."x'....
.... "Fine cats"x² are in great vogue and much caressed at Padua and especially in Venice, where not a house is without 2 or 3, therefore I suppose rats are a great plague. 6 a.m. Lost sight of Euganean Hills, said to be of volcanic origin. 8.10 a.m. Vicenza. Put up carriage at Post house. Olympic Theatre, a very pretty thing shown by a very pretty girl. (Saw the Palazzo Nibeli, always occupied by Napoleon). 2.30 p.m. Verona. Dined, being again a very hot day and then set off for the amphitheatre, (in ruins). I found a canvas theatre erected, and a 'Comedia del Giorno' going on to the great delight of the people, who occupied one part of the Amphitheatre steps. 6.20 p.m. Enter a Valley between perpendicular limestone walls, about 1½ miles across. The look of the People on a sudden altered. Now hard featured like Savoyards. The hills are haunted by bears and wolves.
Aug. 29 - Left Verona - 8.10 a.m. Enter the Tyrol and the valley narrows again. The river (Adige) is very rapid. A boat with wood stranded, and 4 or 5 men crying out for help, which we were unable to afford, because of the might of the stream. Here, the valley is really glorious, the mountains are green with copse wood, while their splintered peaks and wall-like ridges are sublimated and

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x' J.F.W.H. to Lady Herschel.

x² Sir John Herschel was particularly fond of cats!

etherialized by the morning mist and the long sunbeams streaming through. The rains, the tears of the mountains, have worn deep furrows in all their sides, which gleam out white among the dark wood. Form of Monte Scarrucci peculiar. It is funnel-shaped and a side (that towards Adige) broken down. 9.45 a.m. On again with fresh horses. N.B. The first fracture of the limestone sparkles, and is full of crystals. Monte Alacrona; in which the strata are finely disclosed. Here is a curious slip in part as if an unstratified mass had got wedged into a fissure (it has manifestly disturbed the strata).
The valley now grows barren and black. 11 a.m. A strange scene of confusion (114 mile-stone). Enormous blocks of limestone lie strewn about as if a hill had fallen and its fragments been scattered abroad, and no visible reason."x¹ This spot was the scene of obstinate conflicts between the Austrian and French in the Tyrolese War. 12.20. En route for Riva. 12.50 p.m. Passed the Adige on a flying bridge, i.e. two boats and a platform tied by a rope to a pulley which runs on a cord stretched across. A rudder is the guide as the motion is all leeway. The whole lake Garda lies in the groove between 2 limestone ridges. "Henceforth, let no-one ever go to the South End of the Lake, it is tame and insignificant. The North is rough and mountainous, but with the wildest and rudest is blended the sweetest and most enchanting of scenery. The Mountain (2,000 ft. high), which overhangs the town of Riva at the North end of the Lake, is so perpendicular, that I saw the ruins of a house in ye Town which, last winter by the fall of a mass of Stone from the very top, was literally swept clean into the Lake. But then the vale that opens at the side of this tremendous precipice, is all grapes and peaches. They cluster over the road, and the traveller eats his fill without fear of disturbance."*¹ Arrived at Trent.
Aug. 30. - Trent. 10.45 a.m. Left Trent after refitting and preparing for the Tyrol, and had 2 hard battles with the Postmasters and Postillions, who are mere German brutes without the slightest spirit of accommodation, and will mount on the top whatever you may threaten or promise. Watched a noble eagle soaring in the sun, (he could not be less than 5 or 6 feet across the wings), and

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x' See geological accounts of the upheaval here within historic days.

*¹ J.F.W.H. to Lady Herschel.

ye scenery is noble, for the enormous Dolomite masses shoot up almost perpendicularly on both sides, and on the right almost overhangs the road.

Herschel's next point is Bolzano (or Botzen) and so to Innsbruck over the Brenner Pass. At Neumarkt he broke off from James and the carriage and for 10 days scrambled about in the joyous mysteries of unknown mountain ranges, at times quite alone disregarding the possibility of danger ... his object being to take in as much of the country, to collect as many minerals, to make as many drawings, and to see as much of the very interesting race of people who inhabit it, as could be done in eight or ten days. He wrote of his adventures to his mother: "I set out from Neumarkt on an old club-footed white horse, with a creature something between a guide and a stable-boy as to occupation, something between a human being and a brute as to manners and intellect. I left James to keep charge over my carriage and effects at Neumarkt, taking with me only a change of linen, a horseman's cloak, a pair of hob-nailed shoes - my drawing-board, blowpipe, and a huge hammer to beat the rocks over the head, with divers of those useful canvas bags Mrs. Singer[x] was so good as to make for me to contain the game I expected to find. James had orders to wait three days at Neumarkt, and then if I did not return, to proceed with the carriage to Botzen and wait a fortnight longer. I did not like to send him further, for fear his ignorance of the language and want of a passport to produce at Botzen, might create some tormenting mal-entendu.

"I had not been two hours gone, when who should appear but James, dropped from the clouds, with my Barometer at his back, thinking, he said, I might have changed my mind and want him and the instrument. It was clear he was very anxious to have a finger in the pye, but this would never have done, so I sent him back with my thanks. I met three Geologists and a Botanist with a formidable apparatus of hammers, screw presses, etc., as if they were going to carry off mountains and all. One was a German - one French and one an Italian Marchese. The German and the Frenchman were all activity, up the hills and down the hills - while the Italian gave a characteristic specimen of indolence by preferring the jolting of a springless cart among the baggage over unspeakable roads, to using his feet and looking about him. For my part, I found Dobbin so bad and his companion (his half-brother, my guide) so stupid, that when I got to Vigo, the first village in Fassa, I sent them both packing and hired an excellent horse, and the son of mine host, a lad of 15, (a clever, attentive, active and intelligent young mountaineer, as he has proved), to pursue the rest of my journey.

I staid one day at Vigo, to examine the extraordinary volcanic formation in that neighbourhood and then sent my boy "Friday", with horse and baggage on along the valley to Campadello, a village about 10 miles higher up, while I took my hammer and bag, and pursued a course parallel to the valley, but behind the mountain ridge, which bounds it on the Eastern side and at a higher level, by a path called the Pass of Guinella."[x] My host went part of the way to put me in right road, and seemed very anxious lest I should lose myself!

Wound round the peak of Guinella, the summit of which is easily accessible and should have gone up, not being ¼ mile, but the clouds concealed all the view, and after vainly looking over the edge of the rocks, retraced part of my course, and took another circuit round the next hill. It began to rain hard and the whole mountain was enveloped in clouds.

Descended and the whole of the way found nothing but Stilbites and anolcimes, as I descended along a desperate steep path. It grew darker and darker. The clouds filled the whole valley and obscured the moon. It seemed as if I was plunging into a gulph. Night adds terror to things not in themselves terrible. A long and tedious and difficult descent, jumping, sliding and crawling. At length I heard a more uniform murmur than the hoarse interrupted roar of the waterfall. It was the sound of the river, and I must say never was sound more welcome. It gradually increased. Then a light became visible, at first as if beneath my feet, as if with one long step, I could pitch upon it. Its gradual size and position showed it to be in the village below me.

At length I dropped down into the plain, but could not find the bridge, which disconcerted me not a little. After wandering up and down some time, getting stuck in divers bogs and seeing divers goblins (in the shape of old stumps of fir trees) I found there was nothing for it but to take to the water. It proved not much more than

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x The housekeeper at home.

x J.F.W.H. to Lady Herschel, Sep.9th, 1824.

knee deep. I made for a light and found a village. Yelled at the first window that showed bright. The only effect of my yells was the immediate extinction of the light, and no answer. Finding the same kind of reception at all the lighted windows of the village, took another course and peeping through a crevice in a log-hut, saw a man and woman sitting by the fire, I found the door and walked in. On enquiry, found it was Fontenay, and 10 minutes walk brought me to Campadello where the hostess of the little Osteria (The Lion) and her daughter, received me with such alacrity, such exclamations of "O Signor Dio! O Sanctissima Madre!" making a blazing fire, pulling off my shoes and stockings and wiping my feet with warm cloths, etc. that the labours of the day were soon forgotten and a bed with very clean linen closed the scene. (The descent might be about 2,500 feet).

Sunday, 5th September, I went to early Mass where the whole village was assembled. The people are very devout - and the Service as well performed as a Roman Catholic Morning Mass generally is, that is, muttered over in an inaudible voice as fast as possible, like words without meaning. But the Tyrolese are really a very religious people - and their religion is a practical one, for here I find, what I looked for in vain in Switzerland, uncorrupted manners and that honesty which regards cheating as robbery. Genuine and useful attention and thankfulness for zealous service to their employer."

Herschel also noted further, a Tyrolese custom which accorded well with his own attitude towards religion: "At the head of the bed, is a broad wooden board, painted with a very tolerable Madonna, and Bambino. It is very pretty to be thus in sleep overhung by the effigies of one's religion, by a sweet image of maternal tenderness, reminding one by a forcible analogy of the parental care of God over his creatures and recalling that fine sentence: 'Thou art about my path and about my bed and spiest out' etc. This has nothing to do with the question of Catholic and Protestant. It is a feeling common to all human, all created beings.

"I should mention by the way when speaking of the national character of this most interesting people, that religious impressions form a very striking feature of it. I mean the worship of God as a matter of moral obligation.[x'] From every house, in the towns as well as in the remote villages, and lonely cottages among the woods and rocks, at night-fall and at break of day, you hear the loud voice of one of the family (generally the eldest daughter, if there is one old enough), reading Prayers, and the murmur of the whole family alternately joining in the responses. I have seen this family worship going on in the back parlour of a small way-side public-house, while in the front room and before the door, the villagers and carriers have been sitting over their wine or beer, and playing out their game of skittles, of which they were very fond. Their principle too, is carried into their practice. In a country eminently favourable for robbery, such a thing was never heard of. A Tyrolese has no such idea in his head as the taking from another what belongs to him, against his will or without his consent ... The Swiss do not actually rob you and therefore they escape hanging, but they defraud and fleece you without mercy. The Tyrolese leaves all prices to your own discretion - takes what you give him, at a fair estimate of the value of his goods or his services in his own country, with thankfulness, serves you with zeal - anticipates your wants - and when he parts from you, drops on one knee, gracefully kisses your hand and prays for a blessing on your head.

7th September: In the afternoon. I left Campadello and passed the night in a hay-loft on the pastures of Molignon, at the head of the valley of Duron, where there is a most interesting junction of the Volcanic Rock with the common one of the country, which I had observed in a previous excursion and wanted to examine more closely.

It repaid me for my trouble and gave me what I went to get, a very distinct notion of the geology of the country about which the learned are at present in a sad hubbub.[x']

8th September. Off with the lark, and (my horse being already loaded with the specimens I had collected) made this day's journey on foot, crossing over the Pastures of the Seisser Alp into the Valley of the Seiss. It is in the descent to Seiss that the choice Tyrolese minerals are found. We worked all day, Master and Man, found more than we could carry - loaded my horse and guide - crammed all my own pockets and trudged off to Seiss, a pretty neat village, with white-washed stone houses and wooden roofs, a tall church steeple and all that can make a village rural and pretty, in the midst of embowering pear

x' To his friend Grahame he writes "The practice is universal & I have more than once longed for your presence when I have heard ... the sounds of prayer & praise ascending ...

x' J.F.W.H. to Whewell: "Tell Sedgwick that I took Baron von Buch's letter to Humboldt with me among the Dolomites and found the learned Baron a noodle. It is a famous country however, for the "Vulcanists".—
See also Op.48 "Notice of a remarkable occurrence of Serpentine etc" 1825.

and walnut trees, and looking down on the loveliest and most diversified valley, eyes ever beheld. The church is not 50 yds. from my window, but far above its steeple rises the pointed pinnacle of an enormous mountain, (Schlem, height above sea 7,500 ft.) which overlooks the whole valley like a guardian Giant, and whose shaft shoots up perpendicularly from a thick forest of pines, which form a zone round its base. I am fortunate in having seen it in a variety of aspects. At this moment while I write, a thunderstorm is roaring and battling among its cliffs and has been doing so for these three hours past. I have been gazing at it from my window, and three times the lightning has struck (at least to all appearances) right upon the highest point, which I every instant expected to see come toppling down - but it is too solid and vast a mass to yield to lightning.

I found James on my return to Neumarkt quite moped. He had heard from me from Campadello, and forthwith (like a noodle) left his post and set off to look for me, without map or guide and with about as much chance of finding Campadello, as if he had set out for Jerusalem. The consequence which might have been expected happened - he walked from six in the morning till after midnight - lost himself among the mountains - slept in a tree for fear of the wolves and came back the next day half starved and half dead with fatigue, which served him very right and taught him some respect for the hills, which are not to be assaulted in that kind of way."

Sep. 11. - 6.30 a.m. En route from Bolzano for Ober Botzen to see the "Columns" (i.e. Earth Pyramids). Lovely morning Turn off from the high Innspruck Road to the left close to Botzen and climb the Ritten by a paved road ... a glorious view of the Vale of Bolzano with the Ortler Spiyze covered with ice.

10.30. Reached the village of Ritten and thence a mile more brings us to the Earth-Pyramids.[x'] They stand in a kind of Amphitheatre, on the side of a deep and steep gulley, cut by the water in a thick bed of decomposed porphyry and micaschist, a very tenacious kind of sand, mixed with fragments of stone of all sizes from sand grains to many tons in weight. Where a large stone has defended the soft earth from the action of the rain and drip-water, a column is gradually formed with the stone at the top. Sent back my old guide, who wanted to dissuade me from

x' See Stalden p. 47

descending into the Gulley by saying it was impossible. Descended and took a sketch, but not to my mind, being very difficult, and then descending lower still, another better. After which stationing James in an upright military attitude by the most remarkable and going myself to the opposite side of the Gulley, I took the following angles

P.q. (James height subtends) 114-Zero
A.b. Height of column, 1515 - Z.
c.d. Diameter of thinnest pt. 01530-Z.

$\therefore$ P.q. = 1°11 = 71'. Z = 0° 3'.
A.b. = 1511 = 911'. This gives about
c.d. = 12'30" = 12.5. 75 feet in height.

James in the same shoes and without hat (as then) stands 5 ft ... inches = $\therefore$ Vide Passport. James Child was one inch shorter than I.[x] Got in before it grew quite dark, and from almost every house, heard the inhabitants read the evening prayers aloud. After dinner, walked out to a point in the road towards Innsbruck I had noticed coming from Seiss as a most picturesque spot, and took my drawing, (No.76). Great rapidity of the river. It outstripped my quickest walk, which is full 5 miles an hour (English), and it is literally a torrent. Sep. 13 - 6.5 a.m. En route for Innspruck. The Postillions perch themselves on the box in spite of all remonstrances. It is in vain to contest the point, but they will smoke on the box and that I would not stand. Road excellent. The river now is a continual cataract (rushing towards us). The road is all beset with crucifixes under little sheds which are generally very disgusting figures all skin and bones and blood. On right, a picture to commemorate the miraculous escape of a man run over by a waggon. 4.12 p.m. In the ascent of the Brenner among the Mica Slate, a patch of beds of Breccia 4 or 5 ft. thick and horizontal. The stream now very rapid.

5.30 p.m. Brenner. A single house and a church. Hence the road continues along a green fine meadow with moderate hills rising on either side. The Adige, about ¼ mile further, takes its rise in a Waterfall on the left, rippling prettily down a high rock; thence the descent to Innspruck begins, and the waters run down to the North

x' This makes Herschel 6 ft. in round numbers. 5'10" in fact - see passport.

(with us). The difference of level between Brenner and the culminating point cannot be more than 5 feet.
6.2 p.m. A pretty glassy little lake in the greenest little alluvial flat possible. Hence the road descends rapidly in a green grassy hollow. It grew dark, and began to rain and having no light to the carriage, thought it best to put up for the night at the decent post house at Steinach, where we arrived at 7.20 p.m.
Sep. 15 - 5.55 a.m. (plus 27'). Left Steinach. (N.B. Leichtes and Schweres Geld. A way of taxing the people 1/5th more in reality than in name). Postillion a lad of 6 ft. with a dark green feather, another foot long, in his hat. Bright red jacket, and his horn tied under his left arm with a gay yellow and black cord, and tassles dangling down his back. Silver band and edging to his hat. The descent is moderate, the country rather hilly than mountainous. The Sill, already a considerable stream, runs rapidly down in foam and fury however. The clouds from the Inn, fill the whole valley and come even on the road, so that nothing of a view can be seen. The Inn is a very broad swift and deep river, as broad as the Thames below Windsor, and at least as rapid as that river in its most swollen state.
10 a.m. Innspruck. "Golden Sun". N.B. The paper handed to be filled up for the Police, contained the most impertinent questions ... all indicative of the mild paternal character of the Austrian Government. At Table d'Hote met a Mr. Dawes[x], who knows Whewell and Peacock, etc. and who recognized me, we walked out to ye Castle of Ambras.
Sep. 16. - 5.15 a.m. Cloudless, calm and a lovely morning. 6 a.m. Quitted the "Golden Sun". Vale full of mist which lies sleeping in retired hollows in a stratum about 100 ft. thick. (I climbed last night to a spot where these beds were suddenly interrupted by a different rock looking like limestone, but it is non-effervescing, hard, very brittle, and breaks in indeterminate small fragments.) 7.30 a.m. Zoil. A crawling dawdle of a postillion. Waiting an endless time for horses whilst the stupid old Postmaster stands smoking his pipe and cracking his jokes on nothing. 11.30 a.m. Scharritz. Stopped at douane (Tyrolese). 12.13 p.m. Mittelbruch. The first village in Bavaria. Descend by the side of a very blue stream.

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x The "Eagle-Eyed" Dawes. 179?- 18[illegible] Rev. W. R. Dawes, F.R.S.

A pretty vale, broad, flat and full of corn, and potatoes and hay, with fir-covered mountains on each side. 1.20 p.m. Crossing the plain between Kuin and Walgam ... from it a noble view of the Calcareous Alps, behind and right and left. Ragged, peaked and abrupt. This plain lies much above the present level of the river. The Reuss has cut down a channel and passes off to right, Weiss's idea that it formerly ran into the Walcher See, is certainly not impossible, and in that case, this plain must have been a lake of many miles in extent and a depth not exceeding 100 ft.[x]' 2.35 p.m. Walcher See. While the tiresome ostler was gone to fetch the horses from grass, took observations. 4.35 p.m. Hay-making going on all along in a lovely sunset. Scent of the hay, blue sky above, and the green fields beneath, after nothing but rocks and woods and torrents. 5.10 p.m. Benedictshaven. Very cold, but push on. 12.55. Midnight. Munich. "Golden Stag". This day's journey not above 70 miles has taken 18h.55m. which averages 3.7 miles per hour, having been fairly occupied the whole time in the business of getting over the ground.
Sep. 17 - Called at Reichenbach's. Could not see him, he being ill in bed with a nervous fever, the consequence (as I was told by a Mr. Bellish a Banker whom I met there) of over-intellectual exertion and hurry in a journey to Dresden, etc. (i.e. it came on, nobody knows how.) Thence went to Frauenhofer's. He is out of town at Benedictshaven! This is very annoying, as I actually hurried through Benedictshaven yesterday though a most convenient place to stop at, only for this reason that I might get an additional day of his society at Munich, not having the least idea of his Glass works being there, and travelling 5 hours after dark with a wheel so ûbimé as to be every moment in apprehension of an overturn from its breaking. The carrosier put my carriage under a course of surgery. (A mercy the forewheel did not shatter to pieces yesterday as the spokes would hardly hang together).
Theatre de la Cour, (Hoftheater). A concert Madlle. Wranisky from Vienna a 2nd rate singer with a bad manner. A Mr. Mohlick a very good fiddler and a capital flute-blower. N.B. Interior of this Theatre gloomy and

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x cp. (Op 257) "Physical Geography" in Encycl: Britt: 1858

heavy. Cathedral a tall Gothic building in shocking taste. Palace. King's and Queen's Private apartments etc. Walk with Dawes. English Garden[x'], Count Rumford's Monument!!

In a letter to Lady Herschel is an account of how at last he met Frauenhofer: "Sep.20th. I was thus kept two days in agonies and at length Frauenhofer came, and I have been rewarded richly for waiting by the sight of the most superb chef d'oeuvres of Art, and by the free communication of all his processes for grinding, polishing and figuring his glasses which are most ingenious and elegant. His machinery is not very dissimilar (at least in principle) to my Father's, but less complicated from the nature of the work. He is a very liberal-minded man - a man of science as well as an artist, and the weather being fine, he shewed me a variety of very fine experiments on light."[x²]

Noted Frauenhofer's claim to making a screw, 170 to the inch, 3 inches long, no error more than $\frac{1}{1000}$ of a revolution. His original screw is a steel wire wrapped round a cylinder and filed. Cuts his screw top in glass in some cases. Guinand[x³] did work with Frauenhofer. He did see Frauenhofer's processes, but it was many years ago, and when Frauenhofer was not sure of success i.e. when his processes were not perfect. Frauenhofer's glass is not blown. He makes it in lumps of 400 lbs. weight? (or 400 lbs. at once). The bottom of pot and the top are alike. His object glasses touch in the middle. The Flint is a meniscus. Will not sell his glass. Reason, lest ignorant opticians should make no exceptions to a general rule. 3 p.m. Fox-Talbot called and I decoyed him to Captain Feilding where met at Dinner Captain Feilding, Lady Elizabeth Feilding, Mr. Talbot's mother-in-law (stepmother?) 2 other ladies and Frauenhofer.

To Observatory. Saw Soldner, a goodnatured man; was enjoying his pipe. Solid pin goes 16 ft. through clay to Gravel. A vast piece of brickwork. Three instruments: (1) a repeating alt. and Azimuth Circle on middle with 4 stone pillars. (2) A Meridian Circle. (3) Transit. Saw delta Hercules: etha Lyrae (with 7 stars) and Aquilae perfectly well with a 4½ in: Frauenhofer's actinometer. N.B. The apparatus for measuring Ref[n] index of the stars. A prism 4 in: diameter put before the Observatory Glass. Sep. 20 - Called again with Fox-Talbot and Capt. Feilding at Frauenhofers. Walked together to Eitel's. Saw his dividing engine which is the simplest thing in the world. Sep. 21. - 10 a.m. Called on Frauenhofer. Got one of his flint pieces! 10.30 a.m. Called on the Feildings, P.P.C. All at home. 11 a.m. Met Prof. Baseni?? who wanted information on Daniel's hygrometer. 1 p.m. Bought a gold repeater for my mother. 4.45 p.m. Left Munich. (He had previously written as follows to his Aunt in Hanover:) "My dear Aunt, ... I now look forward with full assurance that the Meeting I spoke of will take place. I had originally intended to have gone by Switzerland from Inspruck or from this place having a great desire ... to make certain observations among the Alps, but my wish to see you once more, to assure myself and to be able to report to my Mother how I find you ... and to see my Father's birthplace, these considerations outweigh the attraction of Switzerland. ... The time when I hope to arrive I cannot exactly fix ... thus, I shall go somewhat out of my way to visit Professor Pfaff at Erlanger, and I hope also to find Mr. Encke at Seeberg. Mr. Lindenau at Gotha, Messrs. Gauss & Harding at Gottingen etc. These things necessarily interrupt Post-haste, besides which there are always delays in passing Frontiers, and accidents happening to wheels, springs, screws etc. ... I hope you have not forgotten your English, I find myself not quite so fluent in this language as I expected."

He summed up his favourable opinion of Munich in a letter to his Mother: "Munich is a pleasant place for a short residence with an admirable Public Library - one of the most extensive in Europe, and so liberally conducted that anyone, on a very slight introduction may not only go and read, but take out and read at their leisure almost any number of books. Our British Museum and great College Libraries should hear this and blush ..." 9.25 p.m. Ingolstadt, crossed the Danube. A fortified town. Asked only "Name and Condition" at the gate. Sep. 22 - 10.40 a.m. Left Ingolstadt. Now in a secondary Limestone district. Road rough and bone-setting. This stage has nearly shaken all my bones out of place. 6.10 p.m. The last of a fine rainbow at sunset. 6.30 p.m. Road enters through a hill of extremely red ferruginous sandstone. 8.30 p.m. Feucht, after a desperate jumble over new stones and the ruins of a road. 10.30 p.m. Arrived at Nurnberg.

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x' Count Rumford at Munich 1784-1795. Designed "English Garden", so-called at Munich.

x² JFWH to Littrow Nov 9.1824: "He is the only optician existing I believe who has aimed at applying strict theory to exact data in the construction of his glasses."

x³ Guinand, Pierre Louis. Died in 1824, Swiss glass maker. Was at Munich 1805-1814. Set up then in Paris. After his death his works taken over by Chance of Birmingham.

Sept. 23. - At Nurnberg. Dined at table d'hôte, conversation about Sir Stamford Raffles's misfortune.[x'] Got a map at Campe's, Print-sellers, who told me all about the Caves of Muggendorf.[x²] 4.25 p.m. En Route from Nurnberg. 6.30 p.m. Arrived Erlanger. Here the first thing I did was to get a man to take me to Prof: Pfaff's,[x³] whose house (after some search, his lodging being changed) I found in the Spittal Strasse, near Brandenburgh House. But the bird was flown, being vacation time, he and his wife and children are gone to Stuttgardt, leaving his sister and eldest daughter to keep house. It is a mean-looking house, and bespeaks him poor. Left my messages etc. with Miss Pfaff, who is an unaffected rather good-looking girl, and lamented sadly her Father's absence.
Sep. 24 - 6.30 a.m. En route from Erlanger. 7.30 a.m. Turned out of the high road, for Streitberg to get to the Caves. The Country begins to assume a hilly appearance, low rounded eminences covered with wood from 100 to 300 ft. high. 11 a.m. Left Streitberg on foot (to search for the Caves of Muggendorff). 12 Left Muggendorff with a brute of a guide without activity or information. Reached Gailenreuth Berg. Stone does not effervesce except in certain points where there are obvious crystals of Carbonate of Lime. Temperature of interior of Cave in earth 45°9. 1.55 p.m. Left the Gailenreuth Hole.
Sep. 25. - 2.50 p.m. Left Streitberg which is a cheating place. 8.10 p.m. Bamburg, after traversing, I verily believe, the most jumbling road on earth.
S. Sep. 26. Left Bamburg. 8.5 a.m. Very soft ochry sandstone or grit. Road horrible. 12.0 Leave Bavaria at Bamberg-Forest and enter Saxony. 1.15 p.m. Coburg. (Leopold is here).[x⁴]

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x' Sir Stamford Raffles 1781-1826. Wrecked at sea, lost all his notes for History of Borneo and about £20,000 worth of collections in Feb. 1824. Founder of "Zoo" in London.

x² J.F.W.H. to Lady Herschel, 28 Sep. 1824. "The caves of Muggendorff, near Bayreuth, are great holes in a Calcareous rock, which when first opened, were full of skulls and other bones of antediluvian bears, hyaenas, wolves, &c. &c. The skulls have been all carried off, and there is nothing left but a pavement of bones six or eight feet thick in some places, cemented by Stalactite.
x³ J.W.Pfaff 1774-1835. Prof: Maths: Dorpat, Nurnberg, Erlanger, was translating into German the works of W.Herschel
x⁴ Leopold of Sax.Coburg-Saalfeld, widower of Princess Charlotte (d.1817) afterwards Leopold I of Belgium.

Sep.27 - 10.3 a.m. Meiningen. Approach by a long avenue of Poplars surrounding a green meadow like a wall. There is a show of military here, a dozen or two of soldiers in a little guard-house just by the Royal Palace which is a little country box like a Citizen's. The Duke of Saxe-Meiningen is building (opposite the Post-house) a pretty house with a neat front of 4 Ionic Pillars, an iron rail, and a strip of garden; when finished he will live like the Squire of the Parish! After three-quarters of an hour waiting for the horses from the grassfield, they came. On stating this to the Postillion and desiring him to drive fast, he laughed in my face and put his horses into a walk. (N.B. Road the finest in the world.) 11.35 a.m. Red grit in horizontal beds and in high perfection. Low hills, and a terrible bit of sandy road. Hain. Waggons of wood-coal. They bring it from 4 Stund distance from Northeim. 1.56 p.m. Schmalkalder Posthouse. Had to wait for horses again! The road from Meiningen hither has been all but impassable, frequently the beast of a Postillion was forced to struggle out of it into a ploughed field for relief to his horses. I and James walked a good part of the way for fear of upsetting in the mud, James carrying barometer. This country is the Paradise of geese, the purgatory of oxen, and the hell of travellers. A vast number of women here have goitrous necks. An intolerable nuisance is the flax-steeping in stagnant pools, a sickening stench. 2.45 p.m. In come the horses, dragging the plough at their tails! 3.20 p.m. En route for Gotha, the horses having dined. Abominable road.
Sep. 28. - Gotha. Visited Gardens of Palace. Went with Lindenau to Observatory. Compared Instruments. Returned with Encke.[x'] Gave him Airy's letter about ye Parallax of Mars. Observatory ruinous, part blown down. A Recording Transit. N.B. Saw the Brocken distinctly and a town on it. Distance, 60 miles.
Sep. 29 - 9 a.m. Having called on Lindenau by appointment and found him not risen could not stay longer for fear of being benighted in these abominable roads. 9.45 a.m. En route for Gottingen. (Reminded of the play by Canning "The Robbers", an edifying morceau!:-

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x J.F.W.H. to Lady Herschel. ... "At Gotha, I visited Mr. Lindenau and Mr. Encke - persons famous for their Astronomical calculations. The former is a man of extensive general information and acquirements - the latter, a mere calculator, a most fortunate one however, his calculations having led him to the discovery of a matter of fact, one of the most remarkable in the history of Modern Astronomy. He shewed me the Comet which I had before seen at Padua. It will continue in sight till January." (Encke's Comet. See above page 196.)

"Whene'er with haggard eyes I view
The dungeon that I'm sitting in,
I think of those companions true
Who studied with me at the U-
-niversity of Gottingen .. etc. etc.)!!

7.45 p.m. Heiligenstadt. A clear starlight night of the first brilliancy, but a piercing cold. Put up at the Posthouse. "No man who travels in Germany can complain of want of time for his correspondence. The awful interval that elapses while the horses are fetching from plough, scraping down, and slowly mumbling their oats before their journey, and the repetition of this ceremony, at every stage, give ample time for the most long-winded letter-writer(if he only takes the trouble to have his portfolios ready) to say all he can possibly have to say. Indeed an expert penman might contrive to continue his occupation while en route,(for anything that the speed of his motion could do to prevent him,) but for the desperate jumbling he is made to undergo from the mountains and vallies which compose his road.

"It is a continual earthquake - you can have all the varieties of motion complained of by the unhappy sufferers in such catastrophes - there is the horizontal shock - the vertical one - the lateral, the oblique and the vorticose motion - or in plain English, you have the sea-saw, the jolt - the jumble - the round-about - and the dead-stop.

"Or to change the simile, one's progress in a thorough-paced German high road is like that of a ship in a storm, rolling, pitching and tumbling. Now tossed on the crest of some mighty clod, we look down with horror on the black abyss which threatens to swallow us up below and now, plunging amain, we struggle through the deeps which seem closing in on every side on our devoted heads - the groan of axles ascends to heavens mixed with the creak of wheels and the clang of whips - the fountains of the Great Bog are broken up, and the black mud spouts on all sides, blotting the fair face of the Postillion. He meanwhile, Palinurus-like, sits unmoved, his careful eye fixed on the off wheeler's rump, and only when some more desperate plunge than usual throws him for an instant off his balance, an extra puff from his pipe gives notice that he is a thing sensitive and smoking, (the German definition of a live man). There - there's a description for you - and the best is that it is all true and what happened five minutes ago - and not five minutes only, but every five minutes to-day and yesterday, and will happen again to-morrow and the day after! One's only comfort is that there is not room or possibility to upset. Break down you may, but you must tear all the four wheels from their axles before you can go over."*'

Sep. 30 - Left Heiligenstadt 5.30 a.m. En route.
7.5 a.m. Enter the Kingdom of Hanover! The Black Eagle of Prussia is stuck upon one post, and the Red Crown of Hanover on another a yard off, to mark the frontier.
8.35 a.m. View of Gottingen to right in a stratum of brown vapour like London smoke; one very high tower, and one tall spire are the only conspicuous objects.
9.30 a.m. Gottingen:*2 "Krone von England", a vulgar-genteel kind of Inn. Got letters from Post. Called at Observatory. Gauss absent on Trigonometrical Survey. Found Harding*3 with his pipe in his mouth, and another gent with him. Name not known. Harding very friendly. Stayed with him 2 or 3 hours, with promise to call in in afternoon. Did so. Saw Observatory.
(1) Instruments: Meridian Circle of Reichenbach.
(2) A Circle of Repsold with Reichenbach's counterpoises to tube 15 or 20 years previous to R's.
(3) A Transit of Frauenhofer and Reichenbach with a 5 inch Observatory glass, through which observed several stars and which is distinct. Compared instruments.
Oct. 1 - 5.15 p.m. Left Gottingen. Harding stands by to see the last of me, like a good old soul as he is. After a terrible jumble over break-neck road, reach the old-fashioned awkward-looking town of Einbeck 7.35 p.m.
Oct. 2 - 8.15 a.m. Left "Kronprinz" at Einbeck, en route for Hanover. Gravel Pit 2.45 p.m. Till now, continuation of the shell and other limestone. From this point the Steeples of Hanover all seen, 4 particularly tall on left. Met a number of the beautiful black horses of the Duke.*4

X' J.F.W.H. to Lady Herschel.

*2 To Lady Herschel. "I find here, at Göttingen, Mr. Harding (the discoverer of the planet Juno), and I hope also to find Blumenbach the younger.

*3 L. Harding 1765-1834.

*4 Duke of Cambridge, who acted successively for his brother William IV as either Gov: Gen: or Viceroy in his Kingdom of Hanover, until accession of Queen Victoria in 1837 when, on account of the Salic Law the Duke of Cumberland, son of George III became King of Hanover.

and also a pair of fine white ones. 3.30 p.m. Good view of the Town, the Markt-Kirche Tower is brick, the access to the Town is by a fine straight road, through well-tilled fields, and it is prettily sheltered by a screen of elms. The town is not large, many new houses (farm-houses mostly) building all round it, their fresh red-tiled roofs peep cheerfully out from the trees. A good deal of traffic on the road. It is a pretty, lively and domestic-looking place." Discovery is adding a thrill to John Herschel's satisfaction. Arrived in Hanover! His first visit to his father's native town.[x'] What is it like? Before long he is wandering round streets with familiar names and is delighted to recognize the dear old view of the river between trees, hanging in one of the rooms at Slough. He soon wrote to his Mother:
"Hanover, Oct. 4th, 1824. .... I find all the family here well, and apparently very comfortable. Hanover is a sweet pretty town - neat, quiet, and orderly, surrounded in all directions with pretty walks and ornamented gardens etc. My Aunt seems very comfortable and my Uncle's[x] family do all they can to render her so. She has been busily at work with a Catalogue of Nebulae,[x²] which at her age is a great undertaking, but it keeps her from 'Ennui' when not in Society. Mrs. Grosskopf and her husband live not far off in one of the pleasantest parts of Hanover and their family and my Uncle's are as one.[x³] She is a very nice lady-like pleasing woman. Mr. G. is a good-natured man whose tongue is never still a moment, he seems much attached to her and theirs is altogether as pretty a picture of matrimonial felicity as I know of. They have one child, a boy who just begins to run about and give trouble. .... I reached Hanover on Saturday - dined and put up James and my carriage at the Strelitz Hotel and then went to see my Uncle[x³] who insisted on my shifting my quarters to his house, which I did without ceremony, leaving James behind. The same evening the Grosskopfs drank tea there. Next day (Sunday) Mr. G.[x⁴] accompanied me to the Palace, where I had the honour etc. of an interview with H.R.H. of Cambridge.[x⁵]

x' "On entering Hannover you have only to direct your Postillion to the Markt Strasse No 453." C.L.H. Gotham.

x² See Herschel Chronicle by C. A. Lubbock p.32.

~~x² See above p.191.~~

x³ Uncle Diedrich Herschel and his daughter Mrs. Grosskopf. "Hof-Musiker J.D. Herschel" as stated by Caroline L. Herschel.

x⁵ Governor-General of Hanover 1814-1831. (Augustus Frederick, Duke of Sussex)

x⁴ Herr Grosskopf was also a Member of the Guelphic Order of Hanover

He received me alone and conversed upwards of half an hour in a very polite and gracious manner, enquiring various things respecting my Father etc. He asked particularly after you and my Aunt. Where you were living - whether we lived together etc. I was rather amused at his ending the conversation (just as his Father[x'] would have done) by giving me minute information of the road to England - what were the best inns to stop at - the distances from place to place - the good, bad and indifferent parts of the road - and the time it had taken him to travel them - the things in Hanover I ought to see (among the rest his own library which is remarkable for one of the most superb Collections of Maps I have seen) etc. etc.

"I was sadly disappointed to find the House in which my Father was born exists no longer, other buildings are erected on the spot.

"... After dinner Mr. and Mrs. Grosskopf, my Aunt and self went to the Opera. A Mrs. Langeschwerdt sung two full notes higher than any singer I ever heard before! My Aunt is a pretty constant attendant at the Opera, the Grosskopfs having a private box. On Tuesday we all dined at Mr. Grosskopf's where we met the Austrian Minister, Count Kufstein and a Capt. Müller (whom the Duke had previously mentioned to me as the only scientific man in Hanover, and who really is a well-informed unostentatious sort of person, though I could not find an extraordinary depth of science in him). From him I learnt that Gauss, Olbers, Schumacher and Sir H. Davy were but a short time ago, all together at Bremen. Had I been here a little earlier I should have joined them which would have been very pleasant. By the way, a propos of Dr. Olbers you know he discovered <u>two</u> planets, and on that account and for many other important things is looked upon as the first or at least one of the first Astronomers now living in Germany.

"Now I find that there is a family connexion subsisting between us, round-about enough, to be sure, and only by marriages - <u>but enough to swear by</u>. I was struck and I will confess, rather pleased, by the oddity of the thing, and the next time I have occasion to write to Olbers, I have half a mind to claim connexion with him on this score!"
Oct. 4. Mr. Hausman I also called on and found very well and less doleful than when in England,[x²] he has 2 sons and

x' King George III.

x Mr. Hausman had given Herschel his earliest lessons in German.

a married daughter (Hohnbaum). I called on Mr.Hohnbaum from whom I picked up some very curious information that I sought for in vain at Munich. "In the course of my travels in Italy, Sicily and Germany, I have such specimens of Reichenbach and Frauenhofer's workmanship, as has completely cured me of the weakness of national vanity on the point of the higher departments of Astronomical instrument making. A school of artists who have worked with them is gradually rising in various parts of Europe, and without some great effort, British Art will no longer hold the pre-eminence it has done. Among these, Mr. Hohnbaum of Hanover, who has worked both with Troughton and Reichenbach, explained to me Reichenbach's method of dividing his original model, by the use of the "Fühl-hebel" or multiplying index - which they make a great mystery of at Munich, and which is only a very refined and delicate application of the principle of trial and error combined with that of repetitions. Of the faultlessness of Frauenhofer's glass you may form an idea from the circumstance of a prism of large refracting angle, covering the whole aperture of an object glass 4 inches in diameter and giving spectra of the stars pure enough to see the fixed black lines which cross them! The reflecting telescopes of Amici are hardly less remarkable than the refractors of Frauenhofer and both artists are men of sound science and indeed of original research."x'
Oct. 6 - 11.30 a.m. Left Hanover,x² passing through a pleasant champaign country, flat with occasional low conical hills. 4.10 p.m. Convicts in chains mending the road promiscuously with free labourers (a shame!). Postillion the slowest and sulkiest I have had: "Ich habe noch Zeit" ("Plenty of time!") was all his reply to my instance to urge him into a trot. (Road smooth and level!). The finest sunset under a line of golden clouds. In sky of azure, green line above and below (vapoury) orange. Old coal-pits all about. 5.30 p.m. Undulated sandstone. Rich purple over hills beyond Minden, which form rather ragged low chain.x³ 7.50 p.m. Inn at Minden.
Oct. 8 - 6.10 a.m. En route from Minden after undergoing the insufferable delays of Wagen-meister etc. 7.35. Crossed the Elsa (which flows into the Weser a little below,) on a hanging bridge of two wooden arches (segments of circles).

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x' J.F.W.H. to Sir W.R.Hamilton.

x² J.F.W.H. to his Aunt Oct.1824 "I shall often think of you in your Sanctum Sanctorum and fancy you at work on your Nebulae."

x³ Wiehen-gebirge.

8.15 a.m. Left Rehme, after seeing the very curious salt works. Arrived at Herford Inn 9.45 a.m. 10.15 a.m.Still no horses. 11.26 a.m. Horses put on. En route 11.40 a.m. Road mended with light granite. It is as fine a piece of smooth road as can be imagined, and the lazy beast of a postillion crawls over it like a snail. Through Teutoburger Wald to Brockhagen 3.21 p.m. Horses ordered immediately. 4.25 p.m. Horses to and Postillion mounted. 5.22 Sunset, a wide desolate sandy heath. 9.55 p.m. Wahrendorf (On the Ems river).
Oct.9 - 4.30 a.m. Rose, breakfasted. 5.30 a.m. En route. Wahrendorf has a very good Inn. Opposite Posthouse. They are punctual to time, and indeed beforehand, as were also the Posthorses. No common praise.
9.12 a.m. Munster. At about 2 miles from Munster quitted the sand for a good Macadamized chaussée, a fine broad road, raised 4 or 5 ft. above the sandy heath, through which it is to be carried back to Munster. (Note, later along the road) But this chaussie does not continue much longer, the system of mending the road by bits and patches is again followed. Barriers with: "Verbotener Weg" across some of the best parts, (but the "V.W." is at least as much travelled on as the side road.) 4.35 p.m.x' Road, sand and ruts axle deep. On left vestiges of a road planned and begun by Napoleon of which the drift sand is fast effacing every trace. The Prussian Government does not continue it. 4.40 p.m. Culmination of a very low flat hill. On right a "Charpente-en-bois". (2 scaffolds of 4 stages terminating in a point.) This is a Trigonometrical Station. 10.7 p.m. Wesel Fortifications. Rhein gleaming in the moonshine but clouds.
Oct.10. En route from Wesel. 1.57 p.m. Xanten. A good deal of the Dutch look in this town. Neatly paved streets. Boors in Dutch dress, i.e. plain dark coloured clothes and rough beaver hats.
Oct.11 - 10.15 a.m. Passed Dutch frontier. A few formal questions. I happened unluckily to mention my instruments when necessitated me to show some of them. No mention of Passport. Deep sand, rather pebbly, well cultivated. 11 a.m. Posthouse (Nymegen). 11.45 a.m. All settled and carriage safe packed in the steam-boat for Rotterdam. 12.7 p.m. En route ... N.B. Recommended to a hotel at Rotterdam called the "Bad-haus" on the "Bum-kies" street.

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x' Now in Rhenish Prussia, having passed through Westphalia from Kingdom of Hanover.

Close by is a "Lusthaus te heuren!!" Certainly ye Dutch is a strange language! 7.45 p.m. Reached Rotterdam.
Oct. 12.- A dull moist unpleasant day. Rained a little. Sold my carriage for a quarter or less of what it cost me, to a gentleman whom I met at table d'hote.
Oct. 13. - Found at Table d'hote a large party, like myself, detained by stress of weather.[x] Evening Theatre. Opera of "Barber of Seville".
Oct. 14 - 6 a.m. Rose, packed up etc., and got on board steam-boat. 7.20 a.m. En route for Antwerp.
7.35 p.m. Reached Antwerp. (Letter to J. Grahame - "I shall call on your friend Baily and his neat little helpmate. I hope he has not come to the bottom of his bin where he kept that incomparable wine he treated us with. Oh! It was celestial ... but I fear it was thrown away on you. Oh! Had Jones been in your place he would have worthily celebrated its praise.")
Oct.15 - 5.30 a.m. Antwerp En route from Inn to cross Scheldt to the diligence on other side of Scheldt.
5.49 a.m. En route in Ghent diligence, a vast machine which travels furiously. 10.25 a.m. Ghent .....
Diligence has 9 inside and 2 in cabriolet besides as much luggage in heavy packages as an English Broad-wheeled waggon and only 3 horses! 8.25 p.m. Ypres, a fortified place, not very strong.
Oct. 17 - 6.30 a.m. Left Ypres with a voiturier.
7.30 a.m. Poperinghe, a considerable town. 9.a.m. French douane. 10.40 a.m. Bergues. 2nd Douane. 12 p.m. Left Dunkirk. On right 2 small military positions with moats and batteries. 3.15 p.m. Gravelines. 7.15 p.m. Calais. Horses scarce able to crawl into the town. The revolving lights make a beautiful show in the dark ...
Oct. 18 - Calais. 7.43 a.m. En route in Steampacket for London. 12.55 p.m. Margate. Wind in teeth precisely. 8.45 p.m. Reached Tower Stairs London. (N.B. Go to

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x Caroline L. Herschel to Lady Herschel, wrote next day: Oct.14, 1824: Hannover: I am at this moment in the greatest panic immaginable (sic) for we have had all the week much rain and now it blows a perfect hurrican (sic). I shall not send this till I have heard from you that the dear traveller is safely at home, for it would be cruel to ogument (sic) your anxiety which I know you are feeling till you see him again. I must remain in the dismals till a letter from you arrives."

1824

Galley Quay for Luggage at 8 a.m.)[x'] Drove to Portland Coffee House, where left James.
Oct. 19 - Custom House. Very easy examination. Men ask for drink-money. (Sent luggage from Bolt in Tun, Fleet Street). 2 p.m. En route from B. in T. 3 p.m. En route from White Horse Cellars (Piccadilly). Oh! the luxury of these macadamized roads. See how smoothly the pencil glides as if one were writing quietly at one's own table. 5.30 p.m. Slough. Found my Mother gone to town in search of me. Waited for Mother at Slough.
Oct. 20 - Recd. letter from Mother. Still at cross-purposes. Sent James to town to say I should wait at Slough till 3 tomorrow and then come to town if Mother did not appear. However in evening she came."

Lady Herschel seized her opportunity. Having possession of her son till the end of the month their days fill with social engagements to show off her traveller.

His Diary laconically ticks off these fixtures, briefly reckons up a list of nine deaths amongst her friends since his departure and adds, "Began an Essay on Physical Optics" on Oct.27". Be it noted, this is the inception of his renowned Article on "Light" to be published next year. in the Encyc. Metrop.

By October 29th he slipped off to London with the faithful James to go on with this Essay in Orchard Street, pending his signature to a 3 years' lease of 56 Devonshire Street, Portland Place.

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x' From C. Babbage to J.F.W.H. "Your mother has written to request me to take some steps about getting your instruments through the Customs House, through the Board of Longitude." Now, that important body like the rest of the world is out of town.
"I should advise that you came by packet to London, because you can leave the instruments for a few days at the Customs House while you take steps for getting the duty remitted."

Of course on Saturday he clapped on his hat and rushed round to look up every one he could find at home. Babbage and his wife and family (including Herschel's godson) lived at No.5 Devonshire Street, so convenient for the friends in every way. He spends there his first Sunday in town and if we know anything of Babbage that man's discourse was a vortex of enthusiastic and caustic remarks whirling round about his precious calculating machine[x2] and the subsidy which the Treasury taking account of its utility had or had not promised him, whereas Herschel tried to tell Mrs. Babbage of all his recent adventures and at the same time discuss with her husband all the new scientific thoughts kindling in his brain. In point of fact at the close of the scientific year a paper under their joint names appeared in Phil: Trans: being a spirited account of their repetition of Arago's recent experiments.[x3] They turned No.5 into a laboratory: "Having erected at Mr. Babbage's house in Devonshire Street an apparatus for setting a copper plate in rotation about a vertical axis by the aid of a turning-lathe we proceeded to try its effect on a magnetized needle suspended over it." The needle proves too small. Take something else. On they go with the "trial and error" process of enquiring into the nature of magnetism as excited as a couple of hounds in full cry.

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x1 p.272 Op.58. Known as "Light" in Encyclop Metropolitana - published 1826.

x2 For which the Astronomical Soc: awarded their first Gold Medal - 1824.

x3 Op.45. Repetition of Mr. Arago's Experiments on the Magnetism manifested by various substances during the act of rotation. Phil: Trans: 1825.

Next day he sacrificed the morning to Babbage's workshop in Dorset Street. In this house Babbage spent thousands of pounds of his own money, and of money granted by the Treasury, labouring at his inspiration of a machine which should do all the drudgery of mathematical calculations. Babbage, a man of headlong thought suddenly conceived the restful vision of a machine at work instead of himself! In his own words he describes how on an eventful day "My friend Herschel brought with him the calculations of the computers and we commenced the tedious process of verification ... the discordances were so numerous that I exclaimed 'I wish to God these calculations had been executed by steam'." Herschel replied, "'It is quite possible.'" ... Soon after, having a leisure evening I resolved on devoting it to the preliminary enquiry ... In a few hours I satisfied myself that it was possible to make machinery to compute tables by differences." What would Herschel not have given for such a machine in 1823 when he published his Paper for the "computation of Annual Tables of the places of 46 Principal Fixed Stars etc."? The personal drudgery involved cannot be grasped in our days of mechanical devices unless we put the clock back a hundred years and set ourselves to work steadily through the 60 pages, folio, of "the formulæ employed and the elements adopted" by Herschel in this work.

Babbage's irritation has become our salvation. His unfinished Difference Engine (which cost him £20,000 besides receiving £17,000 from Government Grants) retired to a Museum twenty years later, for in the meanwhile a new creation, an Analytical Machine had blazed up in his mind, but that is another story. The present incident shall close with some recent lines from "Monthly Notes.1932": "Three years ago the Nautical Almanac Office installed a Burroughs Class II Machine ... really a Difference Engine.. (thus) ... realizing the ambitions of Babbage" (after 107 years.)

Herschel tore himself away from this workshop, being resolved to dine at the Athenaeum to put in his first appearance as a Club Member! (He decided better than he anticipated.) In his Diary is the entry: "Walked home with Davy who canvassed me for Secretary, Royal Society, in place of Combe (sic). Agreed." (Accordingly on Dec. 9th, 1824 he read himself in, his own expression, as Secretary of the Royal Society).

And yet the very next day Davy offended against Herschel's sense of the fitness of things. Financial business at a Meeting of the Board of Longitude included passing payments for expenses incurred. Herschel notes with scorn: "Davy insisted on £7. 10 to pay his Posting expenses from 'Somewhere' to Bremen, after solemnly declaring in the newspapers that his travels were at his own expence ... Barrow (Sec. Admiralty) said 'Don't take it', but he persevered."

By straightway accepting Sir H.D's proposition Herschel seems to have brushed aside dormant intentions. Before he set out for the Continent, being thoroughly overstrained, he had written in surprise to South, his collaborator, "Believe me the energy with which you feel on the subject of Astronomy is a thing so unusual that the world is not capable of understanding it ....(For my own part I intend to make Science my amusement not my business.") Similarly, feeling completely disgruntled, he told Dr.Young: "I regret deeply the dilapidated state of scientific matters here at present but I take daily less and less interest in a scene of petty contention which leads to nothing ... my adieux to Science or what is here nick-named 'Science' will, (even) if they are 'last', be 'careless' ones."

However the absolute change in surroundings, language and people, enjoyed immediately the foot touches French soil worked wonders.

In driving across Europe to meet and exchange experiences with "savants" his thoughts rise. He writes: "Travelling in the way I travel is a real intellectual luxury, a continual feast, with time to get hungry between the courses. One object attained, mere change of place brings another into view. A variety of characters pass in review before you and in the transient acquaintances you form you see their best side." Elsewhere he writes to Amici: "I am indebted to the name I have the good fortune to bear infinitely more than any merits of my own for the attention I have experienced on all hands, yet I will indulge the hopes that by some I may hereafter be recollected with pleasure for my own sake." As usual he steadfastly refused to exploit his father's name.[x] In writing to his friend James Grehame towards the end of this Grand Tour he declared: "I feel myself an older man but I would not exchange the sober tranquility of my present state of mind for the careless ignorant innocence of childhood. the romance of 18, or the tumult of passion at any age whatever. It is worth a struggle, it cannot be obtained without one."

Herschel walked away from the Board of Longitude Meeting with Wollaston to be introduced to Mètscherlich[x] but he was not in and Herschel hurried home to welcome his Mother at Orchard Street! However Babbage soon remedies the disappointment. He arrived successfully next morning with Mètscherlich and three friends and carried off Herschel to dine with Mètscherlich's party. Herschel returned "much pleased with Mètscherlich who is mild modest and unpretending".

In a few weeks his duties as the newly appointed Secretary R.S. began. London claimed him as never before in his life and swept him into the whirl and rush of England's central affairs, not excluding a great Civic event, the laying of a Foundation Stone for a new London Bridge by H.R.H. of York. Sir H.Davy P.R.S. and certain Fellows, besides the Secretary R.S. were included in the Banquet given by the Lord Mayor at the Guildhall.

In fact life for Herschel in 1825 coruscated with excitement. He came in daily contact with the leaders of the scientific world from France, Germany, Russia, Denmark, Sweden, who all foregathered in London and inevitably gravitated to the Royal Society and almost as inevitably conferred with the alert new Secretary.

These contacts acted as whetstones sharpening a scythe. He sets about a Review of the Nebulæ visible in the N. Hemisphere being well aware that only his own 20-ft. telescope at Slough could reveal most of those catalogued by his father. Indeed he added materially to that list. On all good observing nights for the next eight years he literally carried on this task in the dark. By the same token, that same telescope was almost the death of him. Though he "repaired ropes of 20 ft." in Sep.1825 he should have put new ropes. By next July they were rotten, for his diary records "Narrowly escaped breaking both my thighs by fall of 20 ft." His father, be it noted, budgetted annually for new ropes.

He took great pride in this instrument, telling Schumacher "the reflector of 18 inches is my own workmanship (en amateur) and though inferior to the exquisite one used by my Father, is by no means .. to be despised."

His daylight hours are fully taken up. Firstly by those experiments with Babbage then with a most valuable Paper to the R.S. on a new method of determining the Annual

[x] See references to Mitscherlich in Herschel's "Light". This was a most important meeting for Herschel.

parallax of Fixed Stars. Though (as he wrote to his Aunt) "not that I pretend to have discovered Parallax but if it exists to a sensible amount I think it cannot long remain undiscovered if anyone can be found to put in execution the method I am about to propose and I hope it will be taken up by Astromomers in general". It was taken up. This was probably the first discussion of that subject. More hours went in a disinterested self-imposed task to help South (who had removed to France), by collating South's forthcoming Catalogue of Double Stars with the M.S. observations recorded long ago by William Herschel.[x1] He assured South that he was so keen about this that he shall give up a pet scheme of his own to finish off some experiments on Light at Teneriffe. He had it all cut and dry, the offer of a passage on a frigate, with Sabine and "some energetic officers to help on the top of the Peak."

However, another form of adventurous work took its place. As a Member of the Board of Longitude he found himself deputed with Captain Colby from the Map Office to supervise the practical work of determining the difference of longitude between the Observatories at Paris and Greenwich.

He had always had a tender spot for this mapping out of the world and constantly replenished a bin, marked "Survey" in the deep cellar of his mind, with a rich and assorted vintage for future use. In boyhood, every time he rode in the coach from Slough to London they drove past the exact spot chosen by General Roy as the starting point of his first base-line for the first Ordnance Survey Map of England. Later we find him coaxing Captain Copeland to climb with him the Church Tower of Langley Marrish to get surveying practice on the not very distant Round Tower at Windsor and he had by chance come into contact with the Transcontinental Surveys on his foreign travels by being the twinkling light between France and England. Only recently he attended the historic gun-powder signals from Monte Balbo, a link in Laplace's chain of stations. About this indeed Laplace chatted to him freely in letters and Baron Zach had gossipped about the accident to Biot (nearly killed at Fiume through a tornado which crashed down their hut and flung him badly injured amongst the falling beams). Laplace said ... "This great operation combined with the Great Arc of Meridian which practically unites the (Shetlands)

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x1 This is found in a Note to South's finished work.

Scottish Isles and (the Balearic Island) Formentara will certainly acquaint us with the figure of the Earth, at any rate in that portion of the globe concerned. If you could hasten this operation I should be much beholden to you ... A thousand pardons, Sir, for the length of this letter but it gives me great pleasure to discourse with anyone of your calibre and of whom I have such a high opinion". Adding in a further letter: "Pray continue your interesting work in astronomy and physics, no one esteems them more highly than I do. You have all the necessary discernment for making observations and experiments besides possessing that great implement which sets them all going, the knowledge of Analysis. What cannot we hope from the union of all these resources."[x1]

Herschel reported their work in a Paper to the Royal Society.[x2] The task being to join up with the French base-line across the water and by five intermediate hops to connect the two National Observatories.

It is odious to compare present methods with worn-out methods unless in a spirit of thankfulness! Herschel's Phil: Trans: Paper and his private correspondence are an astounding exhibition of a slovenly treatment by both Observatories. There was no slovenliness about Herschel. To ascertain for himself why in 1822 Major Colby chose Wrotham for their first station he left London for Hastings in a roundabout way. He posted down via the Eltham road up the escarpment of Wrotham Hill. Then their reasons becomes obvious for "En route" he tested 3 hills before catching a sight of the Observatory on this, the fourth hill. Next morning, because he drove up for the "Great Plain Field", again, he wards off a likely disturbance on the all-important night, for it appears Farmer Maynard objected that the Rockets would burn down his farm. Herschel called at "the pretty home and park" and calmed his nerves. Off again on a

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x1 A verbal reply appeared the only possible acknowledgment of these highflown compliments. James South, established at Passy, accordingly receives word: "Remember me to Laplace with all the veneration I feel for him." - It seems noteworthy that (with the exception of William Whewell) Laplace is the only contemporary savant for whom Herschel expressed, in so many words, this high degree of mental respect and reverence.

x2 Op.53. "Observations for Determining Difference of Meridians of Observatories of Greenwich and of Paris." Phil Trans:

"ruinous turnpike road", (i.e. ruinous huge toll-charges,) to Tonbridge hoping to catch a coach but all are full and posting must continue at eighteen pence a mile! "The road is particularly beautiful through thick copse wood with fine catches of landscape, being very hilly - A great cutting is making to ease two bad hills and fill up the hollow, for which the Turnpikes lay on heavily enough ..... I ordered the driver to go slower, it is too severe (1 mile in 6'21 sec.) nine miles an hour, against such hills as lead up to Battle Abbey." On Fairlight Hill he pitches his observation tent, "erected the 4 night-glasses and pointed 2 to (La Canche) and 2 to Wrotham ...."the weather being so completely an Italian summer that in the daytime nothing could be done." for the heat.

From July 11th to 22nd he and Monsieur Largeteaux observed nightly from about 9.30 to 11 o'clock protected by a Sergeant and 5 men from the Ordnance Office who with horses and waggons conveyed the tents and apparatus.

Herschel's Phil: Trans: Report is a model of suavity regarding the contretemps encountered and ends firmly with these words: "When it is stated that the result appears not very likely to be a tenth of a second in error it will perhaps be allowed that, under such circumstances, more could hardly be expected."

His private correspondence on the contrary, shows up the provocations and delays. "On the French side the operations failed shamefully" after they had specially requested permission to supply the rockets. English exasperation reached a height. Herschel writes "suspicious they were with a vengeance. At Wrotham 19 burst in their frames to the imminent danger of the gunners. I only hope no serious accident may have occurred to the men." From Greenwich come complaints that 54 rockets proved invisible from the Observatory. An incidental delay is that "180 rockets arrived at the Admiralty without sticks". Who should provide these?

The Greenwich Observatory's own Table of Observations gives food for thought. The blue light, made in England, fails to be seen from the scaffold erected on the top of the Observatory and Pond notes that "the Rockets this evening were miserably bad, 5 only were observed, the 8th however might have been a good one. It was lost by all the observers looking too late."! A worse delay arises from sheer French carelessness. Their original choice for

a coast-station was actually invisible from the Paris Observatory! "Thus wasting at least 5 nights." In fact, from what he had seen he certainly does not recommend a second trial" even on a larger scale and with more dependable persons to conduct it on the French side". Herschel thinks it not beyond the powers of the Greenwich and Paris Observatories to ascertain by astronomical data their difference of longitude "without this clumsy method." Personally he shall not care to repeat it.

This philosophical jaunt had a social side. Lady Herschel and her constant niece arrived at Hastings to bear him company. They "sat under" Dr. Fearon ("An Evangelical, Preached faith") in Ore Church and Herschel gives thumb-nail sketches of the gentry at Ore Place, Beauport and Fairlight Place. "Sir H. and Lady Elphinstone[x] extremely attentive and kind people, Lady Elphinstone a truly charming person, lively friendly and well-bred. On the other hand Lady Lamb "a daughter of Lord Eglintoun with every luxury about her and apparently in all ways enviable as to situation, querulous, discontented and ennuyée. A weak woman in short ... Sir Charles Lamb has the affected manners of a 'personnage d'assuré', de bon ton, etc." At Fairlight Place dining with Dr. Batty, the party included his daughter Mrs. Martineau, (a sister-in-law of their dear friend Captain Parry) and also the Elphinstones. He saw a good deal of the latter during the week. "After my Mother & M. were got off, walked to Ore Place took tea with Elphinstones. Walked with them to Hollington Quarry and hammered out shales in the soft sandstone etc." With these adieux he took coach to London being a nine hours drive to the Mansion House.

His Mother, adopting a wiser course, made 5 days of it, in this torrid heat, to reach Slough. Her son, oblivious of the weather and the stuffy London atmosphere, continued work as usual. Took all his work at a gallop. Tore up and down between London and Slough in pestilential coaches fuming at the constant delays. Nature took her revenge and laid him by with a "fever" so-called. (No clinical thermometers in those days.) In the present day we would probably ascribe the breakdown to nervous exhaustion. He burnt the candle at both ends. For at least a year his diary continues to contain constant notes on his health and the swallowing of the then popular drugs calomel and mercury also much antimony, that depressing powder prescribed by Dr. James.

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x Sir H. Elphinstone, Governor of Bombay until 1829.

He recovered sufficiently to take up his official duties again and ~~his Diary~~ ~~he~~ ~~it~~ noted that one of the earliest steam ships, the "Savannah" carried the Cape Circle to the new Observatory at Cape Town in 1826 in spite of the grave doubts expressed only 6 years previously in the Edinburgh Philosophical Journal as follows: "Owing to the vast amount of coal consumed by the "Savannah" in her maiden voyage it seems probable that for general purposes steam will not be found applicable as a power for propelling ships across extensive seas." Herschel's personal experience of a steam-vessel from Sicily no doubt influenced the choice of the "Savannah" in this case.

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p 281 Insert after "one feels after 2 or 3 night walking" →

It also came to the ears of Sir David Brewster × that Herschel was overworking himself and ~~thereby~~ drew from the practical Scotsman an excellent letter of ~~advice~~ suggestions in the capacity of a fellow-sufferer: "... for seven years I never went to rest without my body & my mind completely exhausted and I rose next morning more exhausted still... and I would strongly recommend you the medecine that has saved me. A country life in summer and a devotion of the (time? missing word) to several sports ... or... engrossing pursuit which will keep off the mind from the poison of its own abstractions". [This letter is marked PRIVATE.] If only Herschel would have accepted and applied this sagacious advice from an older man instead of flogging the willing horse! Then his children must have also profitted by such a regime from the head of the house.

Dec 2. 1825 × Sir David Brewster 1781-1868.

In fact he demanded more of his physique than it could supply. Judging from correspondence with Grahame his store of nervous energy ... escaped also in other directions for like his father and his aunt he too was capable of being "uncommonly precipitate". He ... jumped to the conclusion that Grahame had lost his whole income and, for once allowed affection to overcome his reserve. In the impulse of generosity and on the spur of the moment he wrote offering all his own funds to Grahame: "Ah! dear Grahame what news is this?... .... if ever you called me your friend now is the time to show your sincerity by more than words. I am rich. I do not spend my income by some annual hundreds, my expectations are equal to my actual property and .. I am unmarried and likely to remain so. Upon my honour this is a fact. ... Some passages in your last .. have set all the past before me in .. a light so dreadful that sickens my very soul and makes me fly from every thought of woman. Cheer me Grahame - give me something to dwell on with satisfaction ... in the consciousness of being useful to one dear and valued human being. .. In a word - dispose of my Fortune as your own whether to meet your losses or to vindicate your rights and never dream that between us the relation between debtor and creditor can obliterate the more sacred one between friend and friend. It may in sordid and pettifoggy minds but I trust we range above their level."

Grahame replied by return of post. - "Are we not mortal and should I incur the hazard of dying without acknowledgement made of this instance of friendship! But I am not going to bore you with acknowledgements either. All that I shall say is that I fully feel it.

"But you misapprehended the extent of my loss ... other sources will open to me.... When I look around me what cause for thankfulness have I! It is not the least that I have such a friend as you. No more then of this matter."...

Another matter of more consequence to Grahame is to see Herschel happily married, he continually drove in his point. "I think much of the colour of your remaining life depends on your soon forming a happy matrimonial connection. And do beware of a fault that your late experience may introduce into your feelings and proceedings - I mean fluctuation, a needless fear of acting rashly or of having been already rash. If you like-the ~~girl, angel;~~ goddess! (will that do?!) act as calmly as you can in manner but with

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Night-observing continued. He emphasized to one correspondent that his Nebulae work involves complete assurance that one can be, and that one is, at Slough and at the telescope, on certain particular nights, coûte que coûte. His sagacious old Aunt understood the strain and admonished him in these words: "I beg you will consider your health and not encroach too much on the hours which should be given to sleep. I know how feverish and wretched one feels after 2 or 3 nights waking." Yet it might be that official duties in London next day would require an early start in an overcrowded coach and add further burdens of fatigue.

resolved heart, marry her and add to my happiness by promoting your own. ... Oh! Herschel! Marry, marry, marry! ..... I thought you very far from well when I saw you last."

The whole of 1826 is another wild rush of engagements. Grahame came south with his children (about whom he once wrote "the little wretches set off rejoicing to ride in the mail coach and hear the horn".) Herschel found them lodgings and took them out "to feed the swans in Regent's Park" and to feed the deer; "Two very tame and bold and ate out of one's hand." He took Grahame to Vauxhall at night. They saw Green's balloon go up. But he went on with his duties and original work carried on at night or in the daytime and struggling against "continuous sore-throat", Or "overdone at night". Or "very unwell". Or "Passed a sad night - Restless". Or "very ill at night". At last he notes "The first perfectly tranquil night passed for months."

His Mother could well foresee another tour on the continent though the mere thought of it might bring on an attack of gout. His days, not by his own fault were without rule or method, he characterized a certain day as "A besetting day.- From 10 till 4 had not one moment alone - Fitton, Whitfield, Young, Talbot, Babbage, Murchison, all called one after another. (What a mélange of subjects must have passed through his mind in those 6 hours!) Went through R.S. papers all the evening. Extremely feverish or ill again. Came on suddenly. Excitement of the morning and evening too much," yet the next day he was due to take coach down to Chislehurst.

On another occasion, with a crowded day before him, he must have felt like "the morning after the ball" having stargazed all night (and the night before) and overslept till 10 a.m. Then, before starting for London, the precious 20-ft. had to be "dismantled" and left secure, Eventually a kind friend drove him in her own carriage to town. They reached London by 3.30 for an immediate appointment with Hudson the new Assistant Secretary for the Glass Committee to be instructed in his duties. The day ended by a dinner party given by Sir H. Davy at 7 p.m. They sat down a party of 10 including Lord Lansdowne, Captain Parry, Sir Charles Long[x], Stothart etc. Though dinner parties began earlier than at present, they sat longer over the port!

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x Paymaster General.

A few breaks from the ceaseless rush of London clattering past him over the granite 'sets' helped him through the Season. Then at last his Mother, always anxious over John's health, reconciled her mind to another continental tour. He wanted to probe at source into a few geological problems argued around him in the abstract by his geological friends during the last few months. In 1824 he routed some of Von Buch's statements, now his amusing work is to track down the notes of de Saussure, Faujas de St.Fond, Daubeny, etc. But the main query he hoped to answer is a haunting question of his own which he never publicly solved for another ten years. When Sir Charles Lyell published his Elements of Geology in 1836, Herschel's congratulatory letter contains this penetrating remark: "It has always been my greatest difficulty in Geology to find a primum mobile for the volcano, taken as a general not a local phenomenon." A few months later in 1836 he laid that ghost, for Babbage, in his (9th) Bridgewater Treatise prints in extenso Herschel's own theory of a possible solution.

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(1) See JF Forbes' "Life" re Plana's opinion.

JFW# to CLH Jan 14/29
my "Light" — That work has excited a much greater sensation than I expected it would. I am sorry for it as it has made people undertake to translate it. It is now translated into French & German and with them I fear anticipate the effect of a great work I mean to write on the same subject

Which he never did ???

He is in love with his subject. He says: "The mere perception of 'light' is a source of enjoyment; adding to this the richness and variety of 'colour', we are lost in amazement and gratitude."

He was writing this exhaustive article[x'] in the hot enthusiasm of recent discoveries by personal friends. It popularized in all Europe "The undulatory theory of Light" to which he himself became a convert (from Newton's "emission" theory) thanks to the researches of Young, Fresnel, and (to quote his words) "a splendid constellation of great names". He is referring to Laplace, Malus, Brewster, Biot, Arago, all pioneers in research and all (except Malus) his constant correspondents.

This particular journey perhaps might not have occurred if he had not given up the voyage to Teneriffe. Instead of assaulting that Peak with his naval friends he now intended to imitate de Saussure by scaling the Puy de Dôme for his optical experiments.

Arrived with his note-books, his pouches, his hammer and bottles of acid and followed by the faithful James he sailed off down the Thames but first he handed over "Light"[x'] to the care of Whewell to see it through the press, with the following remarks: "I have ordered the Printer of the Encycl: Met: to send you the proofs of my Art: I do not want to write any more than I can help of it away from my references. From the state in which the last two sheets were sent me I began to fear it would not do for me to leave them. It is true I still feel a little as if I were to walk before you once a week without my breeches, but after all breeches are a human invention and may be dispensed with on occasions of emergency! I am afraid, however, you expect more from this article than you will find in it. Of the history of the science I shall keep perfectly clear. I do not want to take on myself a task so invidious as balancing the merits and settling, or even stating, the claims of men so jealous as Brewster and Biot & Arago, who have quarrelled ad nauseam about their claims and their priorities and their discoveries. They are growling at each other in surly repose, but all three will fly at any one who is fool enough to meddle with their bone of contention..."

In his article on "Light", Herschel expresses himself almost blandly, saying: "their" successive labours present a picture of emulous & successful research."

x' It runs to 280 folio pages.

A few breaks from the ceaseless rush of London clattering past him over the granite 'sets' helped him through the season. Then at last his Mother, always anxious over John's health, reconciled her mind to another continental tour. He wanted to probe at source into a few geological problems argued around him in the abstract by his geological friends during the last few months. In 1824 he routed some of Von Buch's statements, now his amusing work is to track down the notes of de Saussure, Faujas de St.Fond, Daubeny, etc. But the main query he hoped to answer is a haunting question of his own which he never publicly solved for another ten years. When Sir Charles Lyell published his Elements of Geology in 1836, Herschel's congratulatory letter contains this penetrating remark: "It has always been my greatest difficulty in Geology to find a primum mobile for the volcano, taken as a general not a local phenomenon." A few months later in 1836 he laid that ghost, for Babbage, in his (9th) Bridgewater Treatise prints in extenso Herschel's own theory of a possible solution.

Obviously the innumerable extinct volcanoes of the Auvergne and the South of France should supply the answer and off Herschel set in such frantic haste that for ten days his diary is a blank and then, with the curt statement: "Aug.28 - London to Calais", it flickers out not to resume its intermittent entries till October.

His departure savours of an escaping pack-horse though he certainly cast the most pressing burden, his celebrated "Treatise on Light" on to the shoulders of Whewell. This is an intensely readable account of a great physical phenomenon.

John Herschel's imaginative faculty operated even in the writing of a scientific treatise. He is probably the first of the philosophers who forgot the ponderous dignity considered essential for a scientific writer. He gives rein to enthusiastic interest in his subject and catching up his readers carries them with him, willy nilly. This essay was translated into French, German, it is practically the first of popular articles on science. Critics* have deplored the time he spent in opening for the masses the doors to scientific truths. On the contrary it required his overflowing imagination, his broad outlook and the vast knowledge of a first-rate intellect to render attractive that bugbear of original research - the drudgery of detail.

(*) See J.D.Forbes' "Life." & Plana's opinion.

Carlton. A 286 - 370

A TOUR IN THE AUVERGNE August 28th to October 12th 1826.[x']

Montargis Sep.3rd, 1826.

Dear Mother, You have heard of the Dog of Montargis?- I expect to see his ghost tonight! - But - To begin a history of all I have been about since we parted on August 28th (I had £286.-.11d cash in hand at starting.) Ives was noodle enough to take the Custom House for the Tower stairs so we had to row a quarter of a mile to the ship. Found Mr. Robison (Grahame's brother-in-law) already on board. We had an excellent smooth passage of 12 hours and passed the two large steam-ships the "Soho" and "United Kingdom"[x²] the latter of 1000 tons and 200 horse engine, the sea nearly motionless and the air delightful. Reached Calais and put up at the Hotel de Bourbon (Rignolle's) at South's recommendation. The Douane wanted to make me pay duty on all my instruments, but the Inspector, being referred to, took me for South and told me he would do all he could which was to "plomber" them and send them on to Paris for further orders. I said I was <u>not</u> Mr. South and on his being informed of my name he at <u>once</u> let my instruments pass without the least restriction or further examination. Next day (Aug:29th) we set off in a carriage I hired of Rignolle who had been written to by South to furnish me with a carriage for the rest of my journey at £12. a month and to take it off my hands on my return. (We were delayed till quarter to ten by the pole of the carriage not being forthcoming). We passed the gates at Abbeville without the least delay.

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x' An association of Herschel's letters to his Mother with his own copious notes. To give a continuous narrative of his wanderings through Central France.

x² Built by David Napier at Lancefield Clyde in 1826. "She was 160ft long and was the first of the leviathans & the public foolishly predicted disaster!" See "Down to the Sea" by J. Blake.

James[x'] is well and was not sick. He commenced his observations on men and manners by pointing out to my notice the remains of four murderers on their gibbets which grace the banks of the Thames below the Isle of Dogs. "Sir" said he in a tone of mingled awe and approbation "There is 4 gibbets, there was a 'hanging' there, they was hung for murder, Sir." I hope as I go on to edify you with many more of his grave yet acute remarks.

We got into Airaines[x²] that night. The postillion gave me a battered tin 5 franc piece and swore I had given it to him, and brought all the people out to back him.

We started next morning at half past four to get in to Paris at 8.30. Between Grandvilliers and Marseille the Postilion and his horse fell and in this instance the value of the large Jack-boots was seen, they saved him a broken leg. Now let me recant all I ever said about the dulness of this road. Calais is now a beautifully neat, clean town and all the towns we passed through bore marks of improvement, all round Boulogne are pretty genteel houses buried in trees.

At 3.50 we left Puiscamps. Here begins the "pavé". Shortly before St.Denis I remarked the imposing appearance of the Palace belonging to the Prince de Condé an old vast irregular mass rising on a wooded hill. We entered Paris leaving Montmartre on the left. Paris itself is making a great stride. It is gas-lighted (though not well and the gas smells very bad) and much cleaner than I could have imagined possible from former experience, all the horrible scents we complained of in 1801[x³] are gone and it is not more odoriferous than London. New buildings are in progress everywhere and the new Square of the Louvre now completed is truly noble as is also the new Exchange (Bourse).

I called on Babbage whom I found not gone to bed, then went to bed a good deal tired at midnight. Mr. R. and I occupied the same set of apartments in the Hotel des Etrangers, we separated in the morning, each went about his business!

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x' The sum of £4. 5. 6 having been paid to his substitute for the Militia, James Child again accompanied his master.

x² Between Abbeville and Amiens.

x³ After the Peace of Lunéville in 1801, the Herschel family visited Paris
See above p.12.

After getting addresses from Babbage, I took a cabriolet to make calls. Babbage seems displeased with Arago for his article in the "Annales de Chimie". He complains a little of his old headaches but is looking well. Mrs. Babbage is quite recovered and looking very well. I found a very warm welcome from such of my Paris friends as are there. M. Bouvard[x'] is quite recovered from the effects of his fall but was very ill of it at Brussels.

At the Institute I met Laplace and had a most interesting tête à tête of half an hour. There is a beautiful calm simplicity in his manner, a most gentle, sweet demeanour, he is above all jealousies of living savans, only he said "Ivory m'a donné de la peine par ce nouvel principe de l'équilibre des fluides, je suis bien sûr qu'il n'est pas fondé, mais il m'a donné de la peine."[x²] He spoke of my Father as he always does with the highest admiration and respect. Plana's attacks he appears not to feel, but contented himself with saying that he is wrong throughout, but that the Calculations are so complicated that he is glad to see them examined by others. He complains of his eyes but appears in excellent looks and is (what none of the other savans are) dressed like a gentleman and very clean.

Dined with Robison .... after dinner I went with Robison to Rieussac to see a "Comptien" (? Tompion) which ended in my ordering one at 400 francs to be ready for me on my return. Rieussac is a clever sort of man who has made a clock ... in principle the same as Kater. Staied a full hour and a half in conversation with him. I learnt little from him but much from Robison's conversation with him for he is as full of information about machinery, as an egg is of meat. Returning home, being attracted by a toy-shop I bought an "optique" of "Interior of a Church" ... Certainly it is a most ingenious people, but this ingenuity seems all diverted to trifles of personal convenience and sensual luxury, which is carried to the highest pitch in Paris. The very air breathes luxury (NB. This summer it breathes very few bad smells, the gas is the worst but that is oil gas).

Next day I called on Baron Cuvier ... Miss Cuvier is a sweet pretty girl and the least French of all the French women I have yet seen. Cuvier gave me renseignments about the Auvergne bones and was very polite. He has a stiffness about his manner almost amounting to hauteur but means well

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x' M. Bouvard and James had both been pitched off the coach from Slough to London on May 26th! (See Diary).

x² "He has given me a lot of trouble", working through Ivory's theory.

and made himself really useful by giving me information and letters sans façon. (NB. Cuvier had on a huge mass of dirty loose cravat, I would not touch with a pair of tongs!) I called on Ampère and Fresnel who live in the same house. F. not at home but saw Ampère (all covered with snuff and dirt) who talked about electricity and magnetism.

I dined with Robison, we then adjourned to the French Opera. "La Vestale" and "Mars and Venus" in which La Galle and Julia danced beautifully and also the three Graces, one of whom, Mauriette, has been 26 years a dancer on ye stage and is still as active as any. The management of red and green lights in the cave of the Cyclops and ye palace of Vulcan seemed almost sublime. Robison and I were separated. I took a "supplement" paying 1g franc more to get a front box seat aux secondes and got into one with 1 lady & 2 gentlemen, one her husband and one her 'galant'. The conversation of these people gave me a most complete idea of French delicacy. Voilà quelques examples.

M.le Docteur (the Galant). "Cette danseuse a la plus belle jambe à Paris."

Madame. "Oui, la jambe est belle - mais la cuisse, regardez seulement, Docteur."

Docteur. "C'est l'exercice qui aplatit les cuisses, une danseuse n'est jamais bien faite .. voilà ce vilain pied."

Madame "Ah, vous critiquez trop, on a beau être bien fait pour plaire à vous, etc."

Sept. 2nd. Called at Lerebours's who showed me a disc of purple glass by Guinard ... which he considers worth the risk of working if Government would buy. It is evidently a very hazardous risk. (Paid Mrs. Feil, G's granddaughter, £50 and took her receipt.)

I went alone to Cuvier's, of course was late having been landed at wrong gate of Jardin. Found at Cuvier's, Humboldt, Faussière, Prony, Babbage and Mrs. B. Mrs. and Mlle. Cuvier, Mme. Biot, Major Denham, Count or Baron Delessert[x], Bougainville, Robison. Cuvier introduced me to Delessert who was the first discoverer of Auvergne fossil bones and gave me a good deal of information about them and introductions to his friends, The Mayor of Issoire etc. ..... At tea, I found myself next to Mlle. Cuvier who talks English very fluently and is as little French as any Frenchwoman I have yet seen .... Humboldt talked as fast or faster than ever, in all sorts of languages, and about all sorts of things.

I began to find that if I staid longer in Paris, I should not get away at all, so I even determined to get the start of my Friends' kindness, and make a short day's journey early this morning, which I have done without breaking my own or James's neck. The carriage I have got proves an excellent one, but to my own and James's amazement had neither linch pins, nor any holes to stick them in. I had the axles drilled in Paris and linch pins put, and took four spare ones in the seat of the carriage which it is well I did, as three out of the four jumped out on the abominable pavement between Paris and Nemours. ...

At Pontthiery I dismounted to look into a quarry and got into a hornet's nest, but escaped stinging!

In the Forest of Fontainebleau we drove past magnificent oaks 50 or 60 feet without a branch and among them huge grit blocks but we saw no bird nor beast. Fontainebleau Palace is an ugly building. We got some grapes and bread at the Posthouse and went on down a hill of grit to a gravel plain and then, having slept the last stage, woke up to find the road running through chalk pits with vertical thick flint strata precisely like those of the beds between Boulogne and Paris, very remarkable and refers the chalk evidently to the same formation. Hitherto it has been a tolerable side-road but from Fontainebleau we kept more on the pavé. "Remarkably few English travelling this year," said the ostler at Chaibly - (I suppose from the Election).[x]

Montargis is a pretty place. I am writing with the remains of a charming dinner before me. There stand, grapes, peaches, and nine-tenths of a melon (which when whole measured 2 ft. 2 in. in circumference). The sky is clear and it promises well for tomorrow, so tonight I hope you will pass as comfortably as I expect to do (from the scrupulously clean appearance of the bed in the Alcove yonder.) Farewell for the present, my eyes draw straws, so believe me etc.

Moulins, 4 Sep. 1826.

This morning we rose with the lark (4.40 a.m.) a delicious fresh morning and lovely sky. The country grew more barren with only immense flocks of turkys picking up a scanty subsistance in the waste land, kept by a few children who have small sharp terrier-looking curs to keep them togetner. The road grew worse and two screws of consequence broken by the joltings, this detained us an hour at Cosnes, the smith being slow to the last degree.

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x Benjamin Dellessert, Baron of the Empire 1812. 1773-1847.

x At the fall of Lord Liverpool's ministry.

1.30 p.m. Descending a steep hill (by the Devil's own particular road for himself and friends!) a splendid view of the broad Loire opened out, beautiful vineyards clothing all the slopes. Near Nevrs on a hill of the finest massive chalk, expands a most glorious view, it is indeed "la belle France", I never understood the phrase before, it is almost Italian. At the entrance to the town we crossed the Loire on a bridge half-broken and restored with a wooden one. Our Postillion (a perfect specimen of masculine beauty and a good fellow) explained this scene by the great torrents lately come down from the hills and which falling on a dry thirsty soil, came loaded with dust (mud) I have no doubt his explanation is right and set him down as a philosopher.

At 6.22 p.m. "The setting sun with farewell sweet". A most glorious sunset under thick lowering clouds all burning like a furnace and under all the Loire, behind on the right, gleaming from out the dark landscape. Oh! lovely! - We changed horses and came 10 miles an hour to Moulins at 11.45 p.m. after a ride in the dark and a soaking down-right rain. Strange romantic dream the while.

Having now made at a stretch 22 posts you may easily suppose I am too tired to say much. Travelling post 100 miles a day in France is no joke, I assure you ...
Your affectionate son J.F.W.H.

Clermont Ferrand, 5th Sept. 1826.

Dear Mother, From Moulins the effect of the violent rains of last night are visible in the roads and nearly caused an overturn. We crossed the broad fine Allier which is running like a torrent by a capital bridge of 19 arches (152 seconds at 5 miles an hour, which gives about 356 yards) The people there seem very well off. The men wear very large slouch black hat and blue linen (coarse stuff) coat, waistcoat and breeches, the coat is like our shooting jacket. The women have generally mob-caps, good coloured gown, and an odd sort of straw bonnet that cocks up behind and before in a very queer way, e.g., a cow-keeper girl was dressed in a coarse but clean gown, rather tidily arranged about the bosom, several petticoats, sabots and a blanket thrown over her shoulder for a cloak.

At 9.40 we left St.Pourcain, a very decent town, no thatched houses in it nor a'beggar to be seen. To be sure the pigs will get into the cottages but then it is their nature! An hour later we came full in sight of great Vulcano-looking cones. The vulcanic chain in all its glory!! and the Puy de Dôme which is extremely steep and abrupt but very vulcanic-looking. We were detained a while by a sort of general convocation of all the Postillions and horses in the country, no less than 6 carriages, at once being horsed and unhorsed and such a jabbering and scolding never was heard. But I got to work on a huge heap of stalactite concretions which at first I took for lava-balls, (but found them to be carbonate of lime from a quarry a gunshot off). Then the postillion rattled us so intolerably to keep up with another carriage that he gave me no time to examine the Butte de Montpensier which might be a miniature crater. So from Aigeperse I went back and climbed to its very curious summit. It is all of a soft fine paste which with the rain is the most adhesive mud imaginable. These Buttes puzzle the geologists here very much. From this Butte there is a noble view of the Chain of the Puys.

Returning to the Poste I called for some beer. Ordered the rest of the bottle to be given to the Postillion. James gave it by mistake to the Ostler: "Voilà qu'est ce que c'est d'avoir bonne mine, on vous a pris pour le Postilion! Vraiment vous en avez beaucoup l'air." This little compliment took immensely. Ostler's pride was raised. "C'est que je cours en Postilion quelquefois moi-même, en défaut." The Maitre de Poste, Ostler, Postilion and Beggars all burst out laughing and we went off like mad.

In all the low country about Riom there has been a tremendous storm and inundation sweeping away walls, houses, roads, crops, and covering fields with sand and mud. Eight persons were drowned and 30 houses swept away at Riom. (As Clermont lies on a hill it was scarcely felt here)

This is a large but indifferent town[x1] entirely built of basalt and scoria and is placed just on the edge of the great Vulcanic chain of mountains which encircle the Puy de Dôme, forming a line of craters from which eruptions of greater volume than those of Vesuvius or Etna, have broken out (in prehistoric times) and covered the whole of the country with lava, cinders and vulcanic matter. The moment you leave Clermont after passing a narrow band of granite you find yourself on a stream of lava, i.e. a long winding bank of black barren rock covered with huge clinkers and here and there mixed with ashes and cinders. This has flowed from the Puy Pariou (which I mounted and found at the top a deep funnel-shaped hollow all grown over with turf about 300 f.t. deep)[x2].....

Believe me, dear Mother, Your aff. son,
J.F.W.H.

P.S. Do not forget to write to me at Lyons.

[x1] "One of the worst-built, dirtiest & most stinking places I have met." Arthur Young. 1788.

[x2] "The brim of the crater of the Puy de Pariou is so sharp... that it scarcely affords room to stand upon." see 'Elements of Geology' by C. Lyell (1838)

(EXTRACTS FROM JOURNAL).

After dinner I delivered my letters to M. Joubert,[x'] collector of fossil bones from Perrier and Mont Boulade near Issoire and from Montaigne de Marcouin near Volvic. Bones of Elephants, Rhinoceros, Fox, Rat, Horses ..... found in Alluvium and in Marl, none or very few in Vulcanic soil and no indication whatever of their having any connection with the volcanic phenomena. Young Joubert is making a collection of insects. He pulls out their insides and stuffs them with cotton into which I recommended him to put a little corrosive sublimate.

Sept.6th. 8.20. En route for the Puys with M.M.Joubert[x'] Busset[x¹] and Fixe or Fuchs of Berne, in a voiture and pair. (One of their cabriolets adapted to carry 4 persons in misery on 2 benches, a most jolting, inconvenient concern which breaks one's neck to sit in it and threatens every moment to do the same by tossing one out of it.)
9.36. At the Grand Tournant below Puy de Pradelles ... It all has the appearance of the currents which lie at the foot of Etna 3 or 400 yrs. old.
11.35. Summit of Sarcouy. View of the plain. Furious wind. Summit of Trachite called Domite, some with, some without felspar. Descending Sarcouy by a slope of 45º. to 50º in the turf and bushes, cross the plain which seems to serve as a plateau for all the peaks and craters here, to the Puy de Chopine and attempted to mount the ravine between it and Puy de la Goutte, but found it impracticable. M. Fuchs got near the top but came tumbling down after being obliged to cut several steps with his knife and in so doing rolled a whole volley of stones on our heads. Got, however, to where the lava in its place underlies a mass of granite. Showed it to M. Joubert to whom it was new. I had not heard of it being here before but it is très prononcé. Mounted the Puy Chopine by the turf which is very steep.
2.45. Finished sketch and descended ... Met M. Fixe coming up who descended with me. Busset had remained behind, complaining of his leg or his nerves and Joubert who had gone to look for Fixe, was found in a great pet at missing us which was his own fault. However, we trotted across the plain to the carriage and dined in tolerable comfort, after which Fixe and I started for the Puy de Cosne near the foot of which we were, tho' the others did all they could to dissuade us and prove it impossible to get up it in such weather (it began to rain and blow) and useless if done. However they went back to the Auberge.
3.41. En route for the Puy de Cosne.

x' Joubert, Receiver General of the District, and geologist cited by Lyell in his "Elements etc" 1838
x¹ Busset "making a Map of the Country".

4.35. Reached its summit where found the most terrible hurricane imaginable. Could only look down into the crater (which is almost obliterated and seems a mere slope from the top) by lying down on our faces.
4.45. (Barom[r] taken etc.) at about 10 ft. below the summit to be a little out of the wind which is so violent that every drop of rain in the face feels like a shot, (my large hammer held by the finger and thumb at the end of handle was blown 25 to 30 degrees out of perpendicular where it was kept steady in equilibrium!) Puy de Cosne is all scoriae. Descended and mounted the Grand Suchet mistaking it for the Pariou. It is also all scoriae. The wind was, if possible, higher here and all one could see was an undulating slope instead of a deep crater. On opening the Barometer to take an observation I found it broken. Descended. After long tedious walk got to Auberge. Found the rest of the party and jumbled home, (half-dead with fatigue and half-frozen with cold and wet,) over 2 long Auvergne leagues back to Clermont where I forthwith got to bed.

Sept. 7th. Clermont 7.50 a.m. Left it on a horse lent me by M. Busset but at 9 a.m. was forced to dismount and send him and the servant back, it being physically impossible to keep my seat from the terrific violence of the wind.
12.10. Arrived at Fontaine des Bergers.
1.0. Reached Puy de Pariou and looked down into the crater which is beautiful .... It is an 'entonnoire' (funnel.)

Sept. 8th. Left Clermont with Joubert at 8 and examined Montaigne de Ladoux which I took for tufa in coming from Riom. It is calcareous as are all the hills which skirt on that road .... Reached Volvic after 2 hours dawdling with a horse which would not go without whipping and which Joubert was too much occupied in talking geological theories to whip, then put up at the Inn there and spent another hour at breakfast, then went to see a training school for young stone-masons who cut basalt into indifferent figures etc. Thence went for no earthly purpose I could discover to call on the Mayor of Volvic!

Sept. 9th. 8.30 a.m. Left Clermont (with James).
10 a.m. Left Barraque. 10.30 foot. 11.55 a.m. Summit of Puy de Dôme. Flying white clouds. (Barometr. observations)[x'] Wind rising, sky clouding. Took drawing from top of the Puy de Dome, hammered the walls of an old building[x²] built

x² The ancient Roman Temple; still to be seen.
x' Herschel states in his "Meteorology" Encyc Brit: that an actinometer was "first used in the field by himself in 1826 on the Puy de Dôme & at Montpellier.

of scoriae, fancying them volcanic in situ, but satisfying myself that it was not so, slid down the excessively steep descent with ease on the turf and after a very long walk reached the Barraque (Home). Bouillet called and talked me dead.

Sept. 10th. 6 a.m. Called on Joubert. NB. Never deliver letters of introduction to Frenchmen, unless for very good cause, if you can possibly do without them. They talk you dead and encumber you with their assistance and their imbecility. Besset is a good fellow, Bouillet has merit knowledge and good nature and is not too proud to learn. Joubert is a bore of the first magnitude! Rougeaux the mineral dealer and guide is the man worth them all.

(End of Extracts)

Issoire, 11 Sep. 1826.

Dear Mother, My last from Clermont will have given you a sketch of our history up to that point. It was all hard travelling.

At Clermont I did a very silly thing, viz., delivered letters of introduction to some French gentlemen. The fact was I only wanted information without their company and though they did everything that was obliging and good-natured, the consequence was that 2 out of the 4 days were frittered away in eating, talking and paying compliments. I have had trouble enough to keep myself out of jealousies and quarrels, for the "doctors" disagree and abuse each other behind their backs. I shall take a lesson and though I have a letter for the Mayor of Issoire I shall take special care not to deliver it till the moment of my departure.

I have never in my life experienced such a hurricane as that which blew on our excursions to the craters, the gravel and cinders blown by the wind absolutely fetched blood from the face. When we reached the top of the Puy de Cosnes we were forced to crawl on all fours to make head against it. That day we climbed no less than four of the chief mountains and tired enough we came back.

On Saturday James and I ascended the Puy de Dôme, the highest of the volcanic peaks hereabouts and remarkable for being the first mountain up which a barometer was carried[x'] The kingdoms of the earth and their glory are seen from the top in one of the most magnificent landscapes I ever saw. I got the only ½ hour clear Sun at the top for my actinometer experiments[*1] The day however was very unfavourable on the whole, it is clear I set out 6 weeks too late.

Sunday Sep.10. We left Clermont Ferrand, en route for Issoire. Wild and beautiful, among a curious mixture of bare granite and rich vineyard. On the left an old Seigneurial fortress which dominates over a village on the Hill. The town and tall round tower of Montfeircux, and the Allier winding among bold granite rocks, form a fine landscape, (the landlord drove a most terrific pace up and down the unparapetted slopes!) Entering Issoire we met all the women walking alone in their Sunday costumes, scarlet aprons and green dresses.

Today I have been bone-grubbing in the vast cemeteries of fossil bones potted up in the earth round Issoire. Upwards of 60 hitherto unknown animals (now extinct) have been found here.

Then I called on the Maire and got from him a note to his "gouvernante" at his home at Malbatu. A filthy farm-yard where in a tumble-down place not much better than a barn is deposited the magnificent Elephant's tusk found in digging a cellar there 2 months ago. The soil is a mixture of large rolled pebbles of granite, quartz and lava and a quantity of loose matter and vegetable mould. While I was there the workmen turned up a leg bone which I took. After waiting 2 hours the gouvernante came and showed the tusk. The old creature has an ox's horn she will not sell: "C'est mon tresor, voulez-vous que je vends mon tresor?" Hoping you & M. are well as I and James are (thank God) tho' we go tired to bed every night. I remain etc.

Montpelier, 17 Sep. 1826.

My last was put in the post at St.Flour (perched up like an eagle's nest on a crag) but whether my letter from it will reach you is rather doubtful with me as the Post-master could not tell a rule for feeing English letters, so I suppose very few English put up here. I was obliged to remain there two days on account of James who was taken alarmingly ill after Lempde where we had been detained by

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x' By de Saussure.

*1 See Art. on Light (Op 58).

a linch-pin starting. He was obliged to get inside. No house near and there he lay groaning. We stopped at Massiac (for a couple of hours) and put James to bed a while. It had all the appearance of the first attack of a violent fever.

Meanwhile I got a vile dinner of 1 pigeon and a scrap of stinking boiled lamb, while my postilion and three of the inn Ostlers were making a famous dinner beside. I kept quiet and content to see their "manière d'être". Que voici: Dramatis Personnae: Postilion in his blue jacket turned up red and 30 or 40 buttons on each pocket. One boy, blind of one eye in a blue frock turned up with red. One ostler, black hair and whiskers, cock nose, a frock once blue turned up with red and blue pantaloons. A Ploughman, "Proprietaire" also in a blue smock and oil-skin hat, (kept on all dinner). Their bill of fare: A capital roast leg of mutton. 1 Large fat roast fowl. 2 Bottles wine, the same of course as everyone drinks. 1 Salad, 1 large dish fried potatoes. 1 Very clean table cloth and a boy to wait. They ate much and talked little except two words noticed by Sterne as "the Essence of the French language" if this could be called talking. After an infernal dinner I went up the hill and sketched the country.

After a most tedious journey I got James to St.Flour at dusk. He was really alarmingly ill, could not speak but lay groaning. I sent for a Physician and he verified all I have ever heard of French physicians. He coincided with me that it was a fever, with my landlady that it could only be "les nerfs" and with the poor miserable wretch of a fille-de-chambre that it was indigestion! He then ordered him (sine a prescription) "2 large spoonfuls weak tea, one small do. orange flowerwater, two lumps sugar, six drops ether" (instanter sumendum). James took it into his head it did him good. I got one of the servants of the hotel to sleep in the next room to his with a light and went to bed much perplexed and passed a very uncomfortable night.

He passed a sad night, but as I found him at daylight in much the same state, I ventured to give him a couple of myrrh & aloes pills. The doctor called again, felt his pulse, shrugged his shoulders and said he had "une constipation" and praised the pills. The dose did not act immediately, so James took it into his head he was going to die and said many moving things on the occasion which I laughed at and doubled the dose. (The people at the Inn were more attentive than is usual at Hotels de Poste).

Being a lovely day, I made some actinometer observations all that morning and also next morning before starting James became much better and is now very well.

Sep 17, 1826. J.F.W.H. to his Aunt Caroline.

... Into Spain I do not mean to go having no wish to have my throat cut. I am told however that a regular diligence runs between this (Montpellier) and Madrid but is as regularly stopped and robbed on the way.

I hope to get one day of intense sunshine while I remain in this latitude on account of some observations I have to make on Solar Radiation with a new instrument[x] which I made before I left England and have with me. I carried it up the Puy de Dôme.....

x Note. This refers to the Radiometer of his own invention.

The delay (and the desperate mountain roads) has obliged me to relinquish my scheme of visiting Mont St.Bernhard which I regret as I could not draw satisfactory conclusions from my observations on the Puy de Dôme. From St.Flour to Marvejols you take leave of the volcanoes and come into a vile and hilly country, the people squalid and few of them. I do not think you would have liked the rate our Postillion drove us down the most tremendous hill with sudden turns, driving like mad and flogging at every turn till he made his horses spring again, flying to the extremest verge, also at the Bridge of Garrabi[illegible] where the road makes the most cruel zigzags to wind down a terrific granite gorge to cross the river Truyère without parapets and where the turns are so sudden that the carriage is almost flung off its balance. This is one of the most ugly dangerous passes I recollect and one ought to look well to one's carriage before one passes it. They <u>will</u> not use the drag.

Climbing up again for ½ hour the road along the summit is straight and good and flat, there is not the least doubt that this hill was formerly capped with basalt. It would be very curious to take the exact barometrical level of the bottom of the basalt throughout this country. Boulders which do not belong to the country covered the summits of hills (not in the valleys), query how did they come? The causes which scooped the valleys why did they not tumble these moveable masses into the hollows left? One block was perched on another so as to form a rocking-stone of great size.

We reached St. Chely at 2.30 on Fair-day. Streets crammed with people, pigs squealing, sheep-killing and cutting up. A most beautiful girl was standing by a trough and looking on at a lamb with its throat cut, and bleeding into a pail, quite unconcerned.

From St. Chely you take leave of the "Poste" and have to work your way at 30 or 40 miles a day on the cross roads. After a lovely sunset and fine moonlight ride we reached the uncouth Inn at Marvejols. (I poured forth there my heart's blood to satisfy the hungry, in fact James and I were nearly devoured in this infernal hole!)

Next day at 5 a.m. we jogged on to Millau. Green pastures such as my soul loveth and walnut trees, the morning fresh and sparkling and the mower at his work before the sun is come upon it and a hundred other pretty things. About half-past seven I sent the carriage on to a baiting place whilst I stopped to sketch the bridge and castle of Montferrant. That bridge I should have crossed. Alas! my Driver forgot to tell me so: "Filez tout droit!" says he. "Keep straight on, you can't miss the road." Straight on I kept and in an hour and a half found myself (under a boiling sun) at St.Cely, 5 miles out of the road. And when I got back half-killed at 11 a.m. there stood my Postilion bawling and using the two French words (the masculine and feminine execrations of the nation) with a force and rolling vigour unequalled. My man began roaring like a lion against me. I began to roar too. But I remembered that a Frenchman begins the war in <u>self-defence</u> because he conceives that violence is a proof of right. So I collected myself and merely said "Soyez tranquille, il n'y a pas du mal de fait" and his rage cooled on the instant - it was all artificial. The landlady however took my part, "It is you, Monsieur, who have suffered, vous avez bien sué, je crois, etc."

Well, I saw the prettiest part of France in this walk, the sweetest retired vale eyes were ever set on, such over-arching trees, such glades, such a village-bell heard in the distance, such a prattling stream and high rocks. A sweet place for a picnic with a party of pretty English-women from — ?! But the delay made us late.

From the Inn we ascended the Causse de Sauveterre for about an hour; a most tremendous hill, the road mounts by zigzags returning short back on themselves. From the top to look down into the valley we left is enough to make one's head spin. You see at once below you 3 or 4 of the the zigzags you have passed. It is of contorted limestone strata. Some parts are quite honeycombed. Great pains are taken with the roads here, they are excellent but most amazingly hilly and winding. At St.Severac I got the best dinner since Clermont and there (as in all this very rude half-civilized country) the people are kind and obliging - no ways imposing. Some of the women have fine faces, a mixed expression of pride and melancholy which is not sulkiness (but smacks of it) and which is the highest expression, as an habitual one, that the human face is capable of[*] it impresses even more than radiant goodness for it enlists your pity on its side.

By 6.30 p.m. we got safe in wind and limb over the most infernal piece of road I ever saw. At sunset we entered a most desolate country of broken limestone ranges, (the finest violet sky in the west and a purple glow in the east), however the moon was full and such a full moon as I never expect to see again. It saved our necks. The main pin of the carriage jumped out in one "soubrésaut", had it been pleased to jump backwards the disjointed portions would have

[*] "In later years the 9 beautiful daughters of Sir John Herschel habitually wore this expression'."(Noted by a contemporary.)

parted company and left us in the middle, as it was the misarrangement was not found out till our arrival at Millau.

Next morning, after replacing the carriage on its bed, at about 6 o'clock we crawled on to Lodève right over one of the lofty limestone hills that took 1½ hour to climb with the assistance of a third horse and when arrived at the top, the town lay close below our feet. it is the boldest piece of road-making, anywhere to be found. Mont Cenis does not surpass it.

A scene of desolation began, a desert of barren broken limestone such as one could not have conceived possible in the heart of 'la belle France'. Waste after waste of dreary limestone, neither trees nor houses nor cattle nor people, in no direction is the least bit of cultivated land. This continues nearly to Lodève the descent to which is by a côte (it ought rather to be called a waste-coat!!) down the most frightfully desolate glen I ever saw. As we descended, the gorge becomes less savage, the vine begins to reappear and the temperature to become sensibly warmer, the climate and culture of Italy begin, vine, olive, mulberry, all is rich and exuberant. The people talk half Italian, "milk" is "latte" and they pronounce the e at the end of words "un-é, tass-é de café" etc.

At Lodève they are building a water mill for woollen cloth for the Army, 150 men will be employed in it. We left Lodève, ("Cheval Vert") at 5.40 a.m. The horse would not budge, stuck fast on the bridge, two or 3 people flogging him, horse rearing and falling on his side. We had to leap out. Then there was harness to change, then Postilion to go back for a piece in lieu of one that would not fit and the restive (or galled) horse to be put on the other side etc. NB. At Lodève I engaged with a voiturier to forward me to Montpelier in 7 hours for 40 francs. We defiled amongst limestone hills and at about ¼ past 9 we reached the summit and saw Pic de St.Loup ten miles away. The road is admirable and nowhere prevents a trot up the hill though when we came to the most luxurious declivity down the Postilion invariably put his horses into the Dead March in Saul. Turning a corner at about 10.30 we came on the view of the Mediterranean which is very disappointing, in fact it is a desolate heath. At about noon we entered Montpelier which disappointed me. No sea view, no views at all, plenty of grapes to be sure but nothing picturesque or striking except a long aqueduct. It is hot and dusty, but there is a good hotel at whose table d'hôte in about ¼ an hour's time I mean to drink your health.

Adieu dear Mother and believe me etc.

Montélimar sur Rhône. 22 Sep. 1826.

On this day I had supposed I might be at Lyons but I am still 20 posts from it and my mountain excursions from hence is not yet begun, so that from Lyons my journey will be strait homewards as rapid as I can make it without breaking of necks. (On re-examining my observations on the Puy de Dôme I find them more satisfactory than I at first supposed.)

My last was from Montpelier, there I went to the Play, a foolish little thing shewing how 3 fine speeches won a woman! Then I took a turn by moonlight on the Promenade where all the sports the French delight in were going on, and then ate an ice at a Café with a flaming transparency. Then I wrote to Talbot[x], my Aunt[x] and others and got to bed about half-past twelve but was waked between 3 & 4 by a thunderstorm which at first kept up only a moderate growl but with very frequent and vivid lightning.

It seemed to go off and the intervals between the flashes became long. Just as I was going to drop asleep again a bright flash and an explosion like a thousand pieces of cannon fired at one instant or a mine sprung under the town made the bed I lay on leap under me and burst open the doors throughout the house and set it rocking like an earthquake. It was such a sound as absolutely froze my blood with horror. The roll after it was prolonged till I was tired of listening to it and died away in a deep groan heard after long intervals when the pattering of the rain was for a moment quiet.

Another quarter of an hour quiet and then another peal; not like the first one explosive but a succession of brazen bangs like a huge sheet of copper on a gong of enormous magnitude, a chilling ghastly sound, fit for Pandemonium. I never heard but one sound like it, the falling of a wall of lava in the crater of Vesuvius but this was 10 times louder. I shall remember these two thunder claps the latest days I live. I never felt afraid in a thunderstorm before but have always gone to the window or out of doors to look at it but this time lay trembling to think what might come next. After this all was quiet.

On the 18th I ordered post-horses and started for Agde to see the vulcano mentioned in Daubeny's book. The country continues beautifully covered with vines and the vintage is commencing. And such grapes! Fully as large as cherries. James did nothing but get down and load himself with them till I really thought we should both be ill

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x'Fox-Talbot. See Op 58 (Light), paragraph 695.

x² See footnote-flyleaf, for an extract from this letter.

with eating them. They gather the grapes into oblong vats, holding about 8 or 9 gallons and 4 or 5 of these go "reeling" home together on long truck-waggons. The making the wine is a filthy process, the raw material is treated with no more ceremony than so much dirt or manure, the grapes are trodden by two of the dirtiest bla'guards in the village. As it is hard work they are all in a sweat, then out they come and take a turn in the dirt with their bare feet and then in again. After St.Jean de Vedas a range of high limestone hills cut us off from the sea - (a furious wind and a storm blowing it off the sea.) From Mèze, where you leave the post-road, you must make the best bargain you can with the postmaster, i.e., you must pay him all he asks you, unless he is a very great rogue indeed. They ask you what you pay the Postilions? The best way is to reckon always at 30 sous a post and if they ask for 40 say that when you give 40 it is always intended as a bonne main to the Postilion for faultless conduct, civility and information. By this means you get well served and inculcate into them the advantage of good behaviour.

At about 4 o'clock we entered Agde a little seaport on the Mediterranean and bagged my vulcano and a very pretty little one he is.

The environs are very flat the hill of St.Loup the only elevated object and it is not more than about 300 ft. Next morning I climbed to the top. There is no hollow which can be called a crater, the east side towards Cette is steep, the chief lava current is directed to Agde, it has all the air of having been spluttered up last century, but all history is silent about it. At the top is a tumble-down old building and vestiges of walls. I descended through vineyard and came on to the lava current to Cape Agde.

Next day we reached Montpellier again, in time for supper.

Before leaving Montpellier (which is a dull stupid place - the torment of mosquitoes was intolerable). I learnt from a French General at table d'hôte that many bones have lately been found at Perpignan, the head of a Deer etc. in stone strata and according to him associated with sea-shell (this I don't believe). We left Montpellier on Thursday at 5 a.m. in a cloudless morning with a moon of pure silver. Such an azure sky just beginning to blush in the east and the west, with the rising sun, rising as one only sees it in these climates. A glorious sunrise! By 7 o'clock we were again among rich vineyards. What gives the vineyard a lively effect is that the gatherers of the grapes work all in a group 15 or 20 together and they are seen some standing and some stooping among the vines.

(In Lunel I ordered and paid for 6 doz. of the Muscat at the Postmaster's at 3 frs. a bottle which is delicious). From Uchaud it was a monstrous ride (over a country of wonderful fertility) in almost an exact strait (sic) line. In front was a lofty hill, its head covered with a dense stratum of cumuli, the Postilion called it Mont Ventoux and says it is 27 leagues from here near Vaucluse and is always covered with snow. He says it may be seen from Montpelier. (I was told at Montpelier, but did not believe it, that the Alps and the Pyrenees may both be seen at once from the Esplanade, for Canidou in the Pyrenees is often seen there.)

We were at Nismes[x] by 10.45 a'm' an hour after leaving Milhaud, (a nasty place full of flies and stenches.)

Nismes is one of the most curious and interesting spots in Europe (Rome and Naples excepted) for its Antiquities. The Inhabitants have chosen to feel their vanity interested in their preservation, and have bestowed an immense labour and expense in clearing the ground about them and preventing the further progress of decay. But they have gone farther, and here I think they stand condemned in every court of good taste and good feeling (where Frenchmen are not the judges) - they have attempted, and are actually employed on, their restoration.

The most perfect, the "Maison Carrée" they have actually furbished up, put on a roof and skylight, placed it on a gay pediment and turned it into a Museum, and there it stands wondering at its present desecration - a temple pretty enough and almost small enough for a ladies' boudoir. The noble amphitheatre is really a superb thing. It is less dilapidated than the Coliseum, but more so than the Arena at Verona. It is really a pity that the inhabitants should have the horrible barbarity to make all their additions and restorations as prominent as possible, everything venerable about it is irreparably injured by the new pillars and arches intermixed with the old. But the French have no idea of greatness or glory not their own - they have no true feeling for antiquity and it is mere vanity - not real respect for these wonderful remains of a people greater than they, which prompts all their exertions here.

Nismes however is a very fine town. Its antiquities are certainly well shewn off, and give the place a character quite unique. In Rome they are abandoned to the contempt and abuse of every vulgar stall-keeper who chooses

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x Nismes is a great place for silk manufacture. I bought some silk stockings.

to build his shop in the most sacred recess of the most sacred temple, or to worse uses. - At Naples you can see nothing unpestered with Ciceroni. - Here all is free and public and well kept.

Farewell dear Mother. I hope your letter to Lyons will contain good accounts of your health. James as well as myself are both, thank God, quite well.

With love, believe me etc.

(A Letter lost)

(EXTRACTS FROM JOURNAL).

Nismes 6 a.m. En route through a beautiful rich country Mr. Ventoux cuts a grand figure.

8 a.m. St.Foix, here I stopped and took coffee (Note: Not to do so a second time!)

8.40 Crossed the Pont du Gard. An ancient aqueduct across the river Gard from rock to rock. Three tiers of arches, the lower of which (modern) now forms the bridge, the 2nd of vast arches 20 yds. in span. These piers hang in the air over your head as if by magic and the upper is a row of small low arches, all of which is one of the most striking and impressive objects I ever saw, both from the grandeur of its execution and the wild scenery among which it is placed. Its effect is heightened to me by coming on it by surprise as I had never heard of it.

9.12 a.m. Defiled through a chain of mountain limestone. The road is excellent and the postilion drives like fire. On a high tableland[x] whence we see at once St.Loup and M.Ventoux. To the east spreads a lovely luxuriant flat vale which reaches to the chain of pointed and fanciful mountains lying at the foot of M. Ventoux which rises like a giant above them all. (NB. The white muscat grape as it grows at Foix is the most delicious fruit on earth.

11.30 a.m. At Bagnols sur Cèze, come suddenly at a turn of the road full on the valley of the Rhône with the beautiful bridge of St.Esprit just in front and the course of the river Rhône beyond (seen far up).

12.55. Passed the bridge which looks best at a distance, it is a very long narrow structure and not in very good repair. (Hence Herschel drove up the left bank of the Rhône to Montélimar[x'] finely situated on a declivity... On the other side of the river a wild rugged country where the highest points are capped with basalt-looking levels. He crossed back over the Rhone and slept at)

Rochemaure. On Sep.23 started on horseback. Crossed the Rhône in two ferries. The first branch is narrow and shallow and James took it into his head that we might ford it.- Ford the Rhône!! The second is wide, deep "arrowy swift" but no longer "blue".

Three extraordinary peaks above Rochemaure, more conspicuous and remarkable than Montelimar Castle at a distance. Rode up to them and examined them. I climbed the most northern. Dined at Rochemaure and set off for Chenavari 3.20 p.m. Summit. On a basaltic plateau a small basaltic eminence projecting above it. ... It is evident that the lavas of Rochemaure have poured down from this ... Descended to the west of Rochemaure Castle. At the Inn I heard a Lecture on "the Deluge" to the people of the place, including a Geometer, an ex-officer etc.

Sep. 25. Rose at 6.30. Rained hard but mounted the Castle of Rochemaure, an extraordinary ruin ... a magnificent view of the Rhone which extends below. Riding all in the wet we got under the eaves of a hut for shelter. No use, so pushed on for Aps ... conspicuous for its large square castle with round towers at the corners. Antiquities have been found there and Roman coins.

Sep. 24. Raining horribly ... As it held up a little in the evening I took a lad to show me the dyke of Chamirelle ... A dyke of hard antique block lava which sticks up above the rest of the country, conspicuous in the calcareous ploughed land. It acts powerfully on the compass. A young Frenchman gave me various information: 'Wild oxen in the Isle of Carmangues', wages of labourers in winter 30 sous 'sans nourriture'' etc.

Sep'25. A pretty paysage (wild enough) Mirabel perched high among fleecy clouds. Descended to St.Privat by a long zigzag and crossed a considerable stream by ferry to Aubenas, (after ½ mile, a dyke cutting through limestone). Immediately the country changes and we have grauwerke[x²] in very regular beds ... Pass ferry at Brigues and on entering Vals mica-slate rock curiously contorted.

x "Standing on that height you survey the valley in one sweep as from nowhere else between Lyons & the Sea... you see the great wave-like lift of the Ventoux ..." Sunday Times Dec 11th 1938.

x' Arthur Young wrote in 1789: "I accompanied Monsieur F de St Fond to his country-seat 15 miles north of Montélimar. St Fond pleases me much, the liveliness, vivacity, "phlogiston" of his character do not run into pertness, foppery or affectation, he adheres steadily to a subject."

x² an obsolete term for a sandstone formation.

Vals is a nasty mountain-town. Inn abominably filthy and the people impertinent and inquisitive, therefore left it for Antraigues after the horses were fed. Up the left bank of the river. The road leaves the river and mounts high on the right bank on the granite among a thick wood of magnificent chestnuts. The valley is steep on both sides and savage and romantic in the extreme. A painter would find a month's work. At a turn in the road Antraigues is seen a little nasty town perched on a granite crag at the confluence of 3 rivers.

For some time we have had glimpses of a high volcanic-looking rounded brown summit which ought to be the Coupe d'Ayzac.

3 p.m. En route to the Coupe d'Ayzac. Having crossed the bridge we ascend a vast wall of basalt. I traced most clearly its superposition on the granite slope ... Mountain scenery with exquisite home scenes of cottages and rural labourers (housing walnuts) ... till we reach slope of the crater of Ayzac. It is very lofty and not very easy to climb where the scoria is dry and loose ...3.55 Arrived at the centre of the Crater, it is cut deeply down by a lip which forms the outlet of the waters which drain from it ... its concavity is filled with fine chestnut trees. Indeed the profusion and grandeur of these trees on its slope on one side with the lava and scoria make one fancy oneself on Etna.

Sep. 26. 7.30 a.m. En route from Entraigues (much geology) 11 o'cl. The neat and simple quiet church of Aizac. A luncheon of eggs bread and brandy. Descended and sent James to get the horses while I explored the Great Grotto (took sketches) returned to the bridge where found James and horses. Reached Inn at Antraigues much fatigued and got excellent dinner at the quiet little Inn. It is dirty like a pigstye below but when they give you a room to yourself, perfectly clean linen, no very great number of fleas and musquitoes and all possible attention and civility.

Sep. 27. 7 a.m. I walked down with the landlord to see the vast basaltic masses (near the rivers). A beautiful colonnade. They are similar to the rest of the basalt through the valley. Returned by a very bad "mauvais pas" round the granite rock above the river which is here a furious torrent in a confined channel, and reached the "Fromage", a fragment of basalt ... a most extraordinary and interesting position proving the whole of this ledge was once covered.

Sep. 28. 5.55 a.m. (Much geology) Immediately below the bridge of Bridon the columns are seen in the water, exceedingly strait (sic) and beautiful and their heads form a kind of wharf or quay (as Fourgas St.Ford has it) well defined.

At Pont d'Aubenas are large silk works. 12.30 Left the slopes of the ascent from the vale of Aubenas and find the Basalt in situ. In the descent to St.Privas filled all my pockets and bags and pouches with the cellular substance which rests on the granwerke. Contains nests of quartz crystals also Carb: Lim: also crystals of beautiful iridescent colour ... At last after long expectations (being tired of looking over every turn of the road) at 3 p.m. we reach St.Privas a neat considerable town.

Sep. 29. 5.44 a.m. En route at 8.40 to Viviers to see M. Flangergues[x].

10.15. Found M. Flangergues (Juge de Paix) in the act of giving audience which however he interrupted and received me in his audience chamber (a shabby library full of dirty people) himself a little man with hooked nose, red eyes, beard ½ in. long in a very dirty once grass-green coat and his decoration at his buttonhole. He is old but lively and works hard at his Astronomy. In March he discovered a Comet and calculated its orbit which is not that of "Gambart"(?). Made him promise to send his observations and his elements to Ast. Soc. NB. He ought to be a Correspondent. (Detained a full long ½ hour at postoffice while ye postmaster calculated the postage of a letter to Babbage!).

At 11.30 Ferry over the Rhone. At 12.47 reached Montelimart again.

2.47. En route for Lyons. Reached (7.30 p.m.) Valence in the dark, or rather by the most magnificent starlight I ever travelled in.

Sep. 30. From Valence at 5.35 a.m. on a fine cloudless morning, the mists lying low in the valley and the poplars poking up their heads above them. First glow of sunshine on the hill to the left.

6.46 a.m. Ferry over the Isère, broad deep and rapid. 24 oxen with a driver sitting on the heads of each pair drag with difficulty 2 or 3 very moderate barges in a string against the stream. (A drawing of the very peculiar method of yoking adopted so that one pair cannot drag the other with the stream).

7.43. At Tain examined Seguinier's Wire Bridge. It is a cheap built bridge rather shabbily executed and rather clumsy concern. About a yard of footway and a clumsy heavy wooden rail. (Detailed description of main chains etc.) They boast of its being built in 18 months, in England as

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x From: Chronology of Events. 1772-1822.
"1812 Aug.21st A Comet discovered at Viviers in France by M. de Flangerges seen afterwards in England."

See forward Oct 17

many weeks would have done.

Tain is on granite yet with this best of materials hanging over the road they persist in heaping it with the loose rolled gravel of the Rhône. Pisé buildings are very common.

12.30. Auberion, a village on a hill of sand ... all the hills are rounded, no abrupt forms.

2.30. Vienne stands under a black-looking granite hill. As the Cathedral is the first decent church I have seen since leaving Paris, it has the advantage of contrast: looks better inside than out. It is pig-fair and cattle-show day. The town is all alive noisy and stinking. Near Vienne are coal-mines, large good coal.

3.50 p.m. Lyons. Just in time to get letters out of the post.[x']

Oct. 1. Went to Mass in the great Church where there is some rich effect of painted glass. Fine effect of a loud Bassoon on a kind of Vox Humana Trumpet in the chanting.

(End of Extract from Journal.)

([x'] He sought fruitlessly at Lyons for de Saussure's basalt vein.)

Lyons, 1st Oct. 1826.

Dear Mother, Being Sunday I shall make only a short stage this evening towards Paris. We reached here last night in time to get your truly welcome letter, I am glad to hear you are comfortably settled in London. What a terrible event you mention in J. Slingsby's death. Grahame relates in a letter I found here from him another death(in his own family.) A cousin of his, on a visit to her grandfather. As she was crossing the hall one morning with her infant in her arms she met a little boy (her cousin) who had a pistol in his hand. She asked how he came to have such a dangerous weapon and desired him to lay it down. He said "There is no danger, it is not loaded" and presenting it at her pulled the trigger and put a ball through her head in a moment!

In my last[x'] I mentioned we were just starting from Montélimar vulcano-hunting. James and I set off on horseback into the wild mountainous country in the Vivarais where we were stared at enough by the country folk but very well treated.[x] The geological drawings I made there have a touch of the romantic which geological drawings do not always possess. Last evening Mont Blanc was seen on our road here at sunset (about 100 miles off (to the East) as the crow flies) cutting a most magnificent figure. He was backed by a deep shadow of slate-coloured haze, reflected from the bosom of which a broad glory like the Aurora Borealis flamed forth in streams (the beams were rose-coloured) as you often see the sunbeams darting through a cloud behind which the sun is. But in this case it was exactly the reverse, the sun being precisely in the (Western) opposite point of the horizon. It is a phenomenon I have only witnessed once before and is rare, but in this instance extremely beautiful. The mountain being almost immediately in the direction from which the rays seemed to come, as it gleamed in the red sunset it seemed as if it were itself another sun. I must give up my trip to St.Bernard, which is not a little provoking being so near and Nicollet at Geneva only waiting a letter to join me at St.Bernard. Well, I must come next year earlier ... believe me etc.

[The five days posting from Lyons to Paris at first meandered through a rich pasture plain (having climbed up from the Soâne valley.) A land of tall poplar avenues, vineyards, pastures and arable, dotted with towns and villages. After the first night at Macon they trotted on through "gently undulating country. (Here Herschel tested the local shell-lime-stone: "It effervesces pretty briskly.") The weather changed and it poured with rain "so made all snug and shut the windows of my carriage and of my head for a while." Through Châlons s.-Soane in rain and low-lying clouds. Much delay at Cerches being market day. Crowded streets and "some danger from huge truck-waggons loaded with casks and a diligence, which could be cut up into half-a-dozen respectable stage-coaches. Everybody with umbrellas, red, blue, white, yellow and mauve." Late in the afternoon just before Autun came a most terrible hill down which the postilion drove like wildfire, the road being cut up by the last rains; Herschel expected every moment that

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[x'] The letter referred to, failed to arrive.

[x] "Like Don Quixote & Sancho, wandering up one valley & down another & thus saw more of the manners of the people than by posting ten times the distance along the high-road." JFWH to C.L.H.

the carriage would fly to bits." Pulled up at the hotel "Wet and cold & wretched and jolted to mummy by that —— hill."

Off again at 5.30 next morning with "rain continual and hard," through a country varying between granite and limestone. At long last in the evening came "a gleam of sun and a very beautiful "Mock-sun, Round, with an ill-defined tail from the sun. Colours, rose-red, fine green, & pale blue." The rain had ceased some time but the sky remained lowering. By nightfall the post-stage was Auxerre with "good attendance and a carpetted floor."

Starting off "before it was light" at 5 a.m.: "The usual process of annoyance in approaching Paris commenced" (presumably because the pavé also commenced.) The bolt of the spring broke and let down the carriage. H. examined the whole machine and found every bolt loose and the "blacksmiths horrible". Much reference now to the chalk formation, especially near Montereau, till at Panton came "as infernal abit of road as" H. ever drove over. "Changed horses with Lady Orkney[x] who recognized James or James her, almost in the dark." With considerable satisfaction, after over 12 hours travelling, James opened the carriage door at Melun at "the large handsome and busy Hotel de France which is in the best style. Their cuisine is capital". Before driving away for Paris next morning Herschel got the "address of their Parisian Hotels 'en correspondence'."

More rain, (but the road not being "pavé" for the first hour or so,) by 11 o'cl. they were in Paris in the Hotel Castiglione "in as handsome and regular a street as will be found anywhere. The houses are all built over arcades of great height, and the column of A forms a magnific ent object in the centre." — The accommodation was equally magnific ent. A suite of "four apartments besides closets, back passages etc., elegantly furnished, carpetted etc at 10 fr. a day".

Paris, 5. October 1826.

Dear Mother, Five days most uncomfortable travelling have brought me into very comfortable quarters in the Hotel de Castiglione just by the Place Vendôme and in the centre of all the sights of Paris. I have sent James to look for letters. I can't help hoping he may bring one from you. But if he finds none — or none that are from printers or other cormorants, calling for copy! copy![x'] or anything else pressing — I mean to do, what I have never yet done — devote three or four days or a week to regular sight-seeing — Get a "Paris Guide" and a Map of Paris and go about as an Englishman broke loose with both eyes wide open — on the full goggle.

I am sorry for the loss of your letter to Geneva as it must of course have been of later date than that I got at Lyons — I shall at all events endeavour to get it forwarded back to England as I set a value on every line of your handwriting.— —.

James is come back, With three or four letters some addressed to Samuel Child Esquire and some to Sir Thomas Dalrymple Hesketh Bar[t] — but none intended for me. I sent him back with them as fast as I could — This is the way people lose their letters.

I shall try to get to see Soult's collection of Pictures which is said to be the finest in Paris.

I am going this morning to see Ampère's Electrical Experiments and in the evening to the Observatory and to Cuvier's evening party — The weather has cleared and is now beautiful.

Do not expect to hear from me again.

P.S. Be sure I shall not cross the Water in bad weather. I mean to go to Dover not to land at once in London, unless there be every prospect of a fine passage.

P.P.S. I yesterday (Oct.6) got your most welcome letter dated the 3rd and delighted I am to find you continue well and have passed your time pleasantly.

(Knowing his mother would see him as soon as any letter he could write, he let records of his sight-seeing lapse. His Journal carries on the tale and runs, with a few omissions, as follows:)

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x' Required for the Article on "Light".

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x' The process being that she took his best horses back to their starting point & H. returned hers back to their stables at Melun. [Cary's Travelling Companion 1814 p.134 states "Near Maidenhead, the ruins of Clieveden & the beautiful woods belonging to the Countess of Orkney."]

Thurs; Oct.5th. Paris. 1826

Dined (excessively well) at the "Cafe Hardy" Boul[d] des Italiens. Called at Ruissac's for my time-marker. Not done and cannot be done by Monday but I may if I please, have one of his ready-made ones such as I never saw before. It is pretty clear from his shopman's (or son's) manner that it has never been put in hand (See Aug.31.)

Paris Oct.6th. Got Passport countersigned, made a long round of calls and walked three times the distance I needed. Found neither Poisson nor Ampère nor Fresnel at home. At the Observatory however found Bouvard in conversation with Wollaston. "Talk of the devil" - says W. And you will see his horns." (Compared Chronometer with Bouvard's.) Bouvard had heard nothing of Flamergue's Comet.

Ampère called to ask me to his lecture tomorrow at 11, at College de France.

Sat. Oct.7th. Paris. Ampère's lecture at 11. He makes an electrical wire revolve by the rotation of a copper plate and many other pretty things. He is much in earnest. Talks very fast, gives no sort of collateral illustration, but all downright theory and experiment. The wires which lay about in all sorts of shapes and twists got stuck in his coat-skirts and he leant his back against the white wall till he was like a miller, and still he went on, explaining away like fury till I could hardly keep up my gravity. Home. Airy and Underwood dined with me.

Adjourned to Observatory where found Bouvard taking [illegible] Aquilae - He had out the 9 inch telescope by Lereboers with which I saw Coronae, blotty and elongated and by glimpses, almost separated. Bad.

Adjourned to Cuvier's where Alexander the ventriloquist made the amusement of the evening. His transformations of face and figure are almost as surprising as his imitations of sounds. NB. He says he has a beating in his throat: To prove it, laid his head against a door and you hear something go tick-tick, like a watch about 2 or 3 times a second. His imitation of a wasp buzzing in your hair excellent.

Sunday Oct.8th. Paris. Fresnel called and we had an entretien in which he explained his ideas about polarization etc. and so forth. It was a mere formality after all, I got nothing unpublished from him, but made acquaintance with the man who is quieter and more modest than some of of his fellow-savants.

After Fresnel was gone, Underwood called and showed me his sketch book with Geological sketches in Valay, Vivarey and Auvergne and among the rest the great Mural dyke near Puy which is little known. Underwood has seen the French world more than any Englishman ought to envy [illegible] He was one of the détenus in Paris after the Peace of 1801.[x1] I will not put on paper all the anecdotes he told me to-day or last night. He was present when Sir C. Blagdon[x2] dropped down dead. I think he said it was at a party at Gay-Lussac's. Went to the Louvre again and the first person I lighted on was Wollaston who walked with me to the end and who is as exquisite in a picture-gallery as in every other situation. The way in which he named all the painters of every style of picture without consulting the Catalogue would make you think he had done nothing all his life but study "vertu". I never passed an hour more pleasantly. Also blundered on Airy, who not being able to see[x] a single picture occupied himself in ascertaining the length of the Gallery! (NB. It is as bad a place for pictures as I ever saw, all sorts of cross lights. Each side keeping up a constant glare on the other. Pictures require the reverse system from sculpture. To illumunate pictures well, the light should be uniformly diffused. To give full effect to sculpture it should emanate from a point, at least so says Chantry who works with a candle in his tin cap!)

Tuesday. Oct.10th.

8.35 p.m. Calais "Rignolle's". NB. It is a first rate French Inn and as such not dear and you are very well attended R's price for the use of a carriage is high. £12 per month - 11 frs. a day. NB. Transport of an English carriage across the water - 3½ guineas - 3½ back - £7.7. (see August 29.)

Wednesday Oct. 11th.

9.55 a.m. En route from Calais. "Duc de Bordeaux" the French mail packet. Man overboard! Soon fished up. The London steamer is given up for the season. Stood to West along the coast to the first land (which is chalk) at East Wear bay near Folkstone.

6.5 p.m. Left Dover.

1826 Oct.12th. 6.32 a.m. Reached Devonshire Street, London.

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x[1] [illegible]

x[2] Sir Charles Blagdon. 1748-1820. Sec. R.S., died suddenly at Arcueil at house of Barthollet. Was a military doctor at Waterloo. Dr. Johnson called him a "delightful fellow."

x Airy suffered from defective vision of left eye. See his experiments with special spectacles as detailed in Op.58 Light, para:359.

re A Geological Tour. (Auvergne)

He summed up this tour in a letter to Whewell:

Oct 1826

"I made a very pleasant trip as far as Montpellier and about 40 miles further south to see a little pocket volcano at Agde. After which I got into the Vivarais which is really a glorious place for geologizing and which has made me an Ultra-Huttonian[xl] in regard of long geological periods. I am come home in better health than I started and hope with care to go through this winter better than last."

An even briefer summary of his wanderings is this vivid little picture of Herschel, followed by James, straying about the valleys near Montelimar; written to his Aunt Caroline:

Nov.18, 1826. J.F.W.H. to C.L.H.
...."In the Vivarais, I travelled over a good deal of the country on horseback with James, like Don Quixote and Sancho wandering up one valley and down another and thus saw more of the manners of the people than by posting ten times the distance along the high road. I filled my bags with minerals and my portfolio with sketches.

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xl. Hutton's "Theory of the Earth", published 1792. Originated the Uniformitarian School in Geology. The mantle of Hutton fell upon Sir Charles Lyall.

J.F.W.H.

Lawnside
Bursley
Ringwood Hants

Herschel says he came back to England "an Ultra-Huttonian," he also seems to have returned with a more determined purpose for his future years.

Tennyson was to express in verse thoughts consuming the hearts of such young men as Herschel when he wrote;

"So many worlds, so much to do,
So little done, such things to be," ! [xl footnote. In Memoriam canto 72.]

Herschel wandered alone through the valleys & mountains of the Auvergne studying the petrified results of titanic battles amongst the elements. He wanders a mere pigmy through their present silence. Eventually he returned from his rustication in better health and with steadier nerves. At such times a young man's thoughts mature rapidly, he classes his youthful dreams of conquering all knowledge into their proper place. A man sees that these dreams have become nightmares of overwork, he can resume his researches relieved from their weight. He will probably decide to concentrate his powers where they give him most satisfaction, other speculations he will treat as brief excursions. Above all he would resolve to avoid the snare of holding public appointments.

Also enclosed p 214 & p 215.

Full of health and energy from these carefree weeks abroad Herschel soon polished off a correspondence consisting of a pile of letters from Cambridge about the Lucasian Chair which awaited him at home. They announced Turton's resignation.

First, Hornbuckle, Tutor of St.John's, anticipates that Herschel will offer himself as a Candidate, in fact "the Chair of Newton cannot be better filled"[x1] he said. Herschel set aside this thought from "a mere sense of the incompatibility of it with my present duties and my future plans which are grounded on a conviction that I shall do more for science as an independent amateur than as a Professor of any particular branch."

Next, to Dr. James Wood,[x2] now Dean of Ely, he replied that he did not wish to oppose "so distinguished a man as Babbage even were personal intimacy out of the question."

There was also a letter from Whewell in his most friendly manner urging Herschel to stand, saying:

> Oct.13th 1826. "Everybody would be delighted to have you fixed here in official connection with the University and I have no doubt you would come amongst us and lecture till our hair stood on end."

But, being quite unaffected by Whewell's enthusiasm, Herschel's reply is a letter of faithful self-portraiture:

x1. Bishop Thirlwall in his "Literary Remains" refers to Sir John Herschel as "The Philosopher who of all, perhaps, in our day best deserves to be styled a lineal intellectual descendant of Newton ..... etc."

x2. Formerly Vice-Chancellor - See back. Page 74.

"17 Oct. 1826 .... I am greatly obliged to you for your notice respecting the Lucasian Professorship about which Hornbuckle has also written to me and for which I have unequivocally and finally declined becoming a Candidate. It is not that I am unsensible to the credit of the thing, of filling (as you feelingly put it) the Chair which Newton & Barrow have held, neither is it any silly pet taken at my former unsuccessful attempts to attain Professorships at Cambridge, nor any undervaluing of the real utility and dignity of the situation which led me to this determination, but simply "a truant disposition, good my Lord", (for which I think I can at this moment hear you scolding me) which makes me not wish to devote myself exclusively or 'par excellence' to any one branch of Science, perhaps to a consciousness that I prefer physical to mathematical science, and that the preference is increasing as I get to know more of one and less of the other. I don't know whether there is not a little <u>vanity</u> too at the bottom of it (which to you who are not a Minos or Rhadamanthus to your friends, I may confess) that what little I may hereafter do for Science, I had rather should be considered as done 'en amateur' than as a matter of duty and profession, and possibly too a kind of obscure consciousness that I am not destined (like great hard-headed thinkers such as yourself) to make giant inroads into great branches of human knowledge, but rather to loiter

* Here Herschel drifts into a simile from Sir Isaac Newton's writing.

on the shores of the ocean of science & pick up such shells & pebbles as take my fancy for the pleasure of arranging them and seeing them look pretty ...."

It is highly doubtful whether this warm welcome from Whewell really reflected University atmosphere. In 1826 Heads of Colleges longed less to have their hair set on end from a Professorial Chair than for some one who would see that the port passed round at the High Table and be a good fellow in Common Room.

No one will suppose that John Herschel could ever fill that bill after reading the following serio-comic remarks written to him by Grahame. For though Grahame burlesques him he hides a word of truth in the chaff. He pictures John when a very young man lounging against the piano to watch in scornful boredom the evening whist at Slough. Later he laughs at John being seated at dinner wrapped in deepest thought whilst the ladies prattle on. Suddenly John jumps up calling for "The health of James Grahame!" Indeed he took Herschel seriously to task in more recent years:

> "O! Herschel, eradicate if you can that sneer that so often curls your countenance. X. said to me the other day 'I should think that Mr. Herschel, from his face, was a very sarcastic person.'"

Elsewhere Grahame repeats to Herschel a more kindly criticism by his niece:

> "At first he (Mr.H.) inspired me with so much awe that I was afraid to speak to him, but the more I saw of him, the more I admired him and yet the more I felt at ease."

These awe-inspiring manners remained through life, Darwin, who conversed[x1] with him at the Cape of Good Hope in 1836, seems to have felt it, and late in life it still continued, as mentioned to the writer by one of his sons-in-law who used the expression "watched him with awe." Yet which of us would not be disarmed by Herschel's mild reply to these strictures?

> "22nd Feb. 1827: You do me too much honour by calling it sarcastic .. However I will take my face in hand and try what can be done with it and whenever I feel the corners of my mouth rising with anything of a Sardonic curl I will think upon the texts about charity thinking no evil etc. and figure to myself your features where sarcasm has no place. Except when you talk of the Quakers & then it rises to bitter irony."[x1]

To resume our narrative at the time of his recent return to England. After touring those volcanic regions he naturally gravitated towards fellow-enthusiasts. He dined at the Chemical Club & often drifted into the rooms of the Geological Society. But the moss-grown conventions of public offices confronted him wherever he strayed. These disappointed his sense of moral rectitude and within a few months he took a decided step having acquired by his duties at the Royal Society familiarity with the usual procedure to be adopted.

Accordingly a few months later he invited a party of his friends to dine at his house in Devonshire Street and most urgently discussed with, ~~inter alia~~, Daubeney, Scrope & Babbage & others, the

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x1. It should be remembered in this connection that the word "awful" still meant "impressing awe" until its slang adoption circa 1875. M. Darwin used the expression "awful manners".

x1. See James Grahame's own "History of U.S.A." re religious persecution of witches circa 1692.

x2 Scrope

question of limiting the Presidency of the Geological Society to 2 years as he had somewhat similarly attempted at the Royal Society in 1820. This was a damp squib. The Geological Fellows evidently preferred to remain undisturbed by changes until 18 .

On the last day of this year 1826, "chemistry" proved almost the death of him. He narrowly escaped from poisoning himself. In his Diary he gives all his horrid symptoms of mercuric poisoning adding that "by an abominable blunder" of his housekeeper he had swallowed a pill said to have contained 3 grains of corrossive sublimate "instead of a blue pill or some such abomination"!

Round about the New Year the index-making for "Light", a tedious and necessary work, wended its weary way towards publication. As usual Herschel plodded ahead to the end of the road without amanuensis or any sort of assistant, even the final fair copy of the whole work would be in the hand-writing of Herschel. How he performed this is a constant marvel magnified by reading a letter about some other work to his Aunt Caroline dated 4th May 1827:

> "I have just completed a second Catalogue of Double Stars[x1] which will be read at the Astronomical Society (of which I have now the honour to be President) on Friday (11th May) next (if I get it fair-copied in time). My work in the review of Nebulae[x2] advances slowly as I can very seldom get a night or two at proper times of the Moon and year to sweep. But I find your Catalogue most useful.

x1. Op.61 & periodically in Monthly Notes R.A.S. till 1870 (the number appeared when he was aged 77.)

x2. See Op.94 published in 1833 Phil. Trans.

> "I always draw out from it a regular working list for the night's sweep and by that means have often been able to take as many as 30 or 40 Nebulae in a Sweep. I have now secured such a degree of precision in taking the places of objects in the telescope that the settling stars (which I prepare a list of each night and arrange them in order of R.A. in the working list) cross the wire often on the very beat of the Chronometer when they were expected and not unusually enter the field of view, bisected by the horizontal wire of the eye-piece. In short I reckon my average error in R.A. in determining the place of a new object by a single observation, not to exceed 1 second of time, and in Polar distance a quarter of a minute. This you will easily perceive (sic) to be a considerable improvement in respect of precision, which is more my aim than it was my Father's, whose object was only discovery. I have found a great many Nebulae not in your Catalogue and which therefore I suppose are new ....."

Herschel also gave his Aunt a bit of exciting family gossip:

> "On Mar.18th 1827 when the Herschel party breakfasted at Campden Hill with James South, newly returned from France) we read in the Times a statement that Lady Herschel on that occasion laid the Foundation Stone of South's new Observatory on Campden Hill.

From 1827 for upwards of 30 years public offices and their official duties constantly disappointed Herschel's dream of spending undisturbed days and years in the pursuit of knowledge. For example at the lamented death of H.R.H. the Duke of York on Jan.5th 1827, as Secretary of the Royal

Society Herschel had to be occupied by all the official condolences on the death of a member of their Royal Patron's family. As a mourning token the Secretary received a tiny circular ivory box containing a medal of the Duke in gold, on its reverse the words: "Multis ille bonis flebilis occedit - non - Januar 1827." [The nones of Jan.= 5th Jan:]

But whilst loitering on the shores of Science making patterns with the pebbles, as he told Whewell, it seems that Herschel forgot to take into account, as regards his own abilities, the rising tide of scientific opinion. Indeed he owns that this took him by surprise when it swept him forward into the Chair of the Astronomical Society and engulfed him in more officialdom.

In recent years he had been picking up on the "shores of science" shells & shining stones to fill his pockets with iridescent light. Purely mathematical pebbles on this shore ceased to attract him after about 1820 when he sent his paper on Functional Equations to the opening volume of the Cambridge Univ^{y} Philosophical Soc^{y}.[x] He had already, in Brewster's "Edinburgh Philosophical Journal", 1819 enlarged upon the beauties of Mother of Pearl from a scientific view-point. Thus, from discussing the iridescence of Mother of Pearl, his papers plunge onwards to the causes of certain phenomena in prismatic rays when exposed to a polarized beam of light and until 1822 he published further

x Now known by the title "Cam: Univ^{y} Mathematical Soc."

considerations on this aspect of light. Then for a time after the death of his father papers on practical astronomy, star catalogues, the use of instruments, their construction, enquiries into magnetism and electricity and the Royal Society's Bakerian Lecture kept his pen busy. But his twin-self[x1] still pursued the quarry - "Light". He invented a photometer[x2] and in all his travelling diaries are minute notes relevant to light effects, whether of the gorgeous skies of twilight and sunrise or on the brilliance of stars & the twinkling of signal lamps, till at last gathering all his accumulated knowledge of this subject and his theories into one brochure he handed over his Article on "Light" (circa 250 pages) to the Encyclopedia Metropolitana for publication.

The appearance of this Article on "Light" by John Herschel, (seen in part through the press by W. Whewell himself a coming man,) is of boundless importance. In it he abandons Sir Isaac Newton's "emission theory" which had held sway since 1672 in favour of the "undulatory theory" of light. "This admirable treatise besides including many original discoveries gave European currency to the UNDULATORY theory of light[x3]."

The lucidity & power exhibited in this exhaustive

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x1. See back p.
x2. See back p.
x3. See Dictionary National Biography.

pamphlet focussed upon Herschel the already growing attention and comments of philosophers.

He was elected President of the Astronomical Society for the Session commencing in February 1827, with the duty before him of presenting the Society's Medals awarded to Francis Baily (late President) & Captain W.S.Stratford, R.N. (Secretary) for their Catalogue of Fixed Stars and to Colonel Beaufoy for his observations on the eclipses of Jupiter's satellites.

Willing & eager Herschel might be to devote himself to the cause of philosophy but with this additional position thrust upon him, even he had to announce his coming resignation from the office which he already held, of Secretary of the Royal Society at the end of the Session 1827.

As regards his successor, during some fireside conversation with Babbage, Herschel in all innocence urged him to try for the Secretaryship. It must have been in later discussions that some other Fellow murmured the warning word: "Patronage", so hateful to both men alike.

Babbage, careless whether he broke a lance with Authority or not, leapt at the post before he studied his chances. In his burning haste he expected strong backing from his friends and instant success. No such thing! "Patronage" stood in the way and he lost it by his own conduct in letting his undisciplined temper break loose, notably in the rooms of the Royal Society.

His wild conduct cut Herschel to the quick, he had done his utmost for Babbage. He disburdened his soul to Grahame: "11 Feb.1827 .... He has disappointed me very much. He accuses his friends of not going lengths enough to serve him, of leading him on for insult and indignity, of lending their countenance to jobbing etc. etc. With the utmost difficulty and by nothing short of the strongest entreaties as a personal favour I prevented him the other night from taking a public step which would have had the effect of setting the whole Royal Society together by the ears. He yielded - but making it so great a favour & putting it in so strong a light that I must say another such victory and Pyrrhus is undone. I fear our mutual regard will never be what it was & that I have lost a friend by an ill-judged attempt to serve him. However perhaps his mind will take a better tone ..... The whole of this affair has mortified me beyond anything. The only thing which could have justified an interference with the known or, at least, strongly suspected wishes of Davy in the choice of a Secretary, was the high eligibility and worthiness of the man. To prove this, when unsuccessful his bearing should have been calm & dignified, he should have avoided all mention of the subject & Davy's name should never have escaped his lips before indifferent people. I don't like, however, entirely to condemn him. Looking back on the whole transaction I

take blame to myself, for having written him an account of it (too) while myself angry & perhaps too had I known better the people I had to deal with I should not have rated so highly his chance of success in the beginning."

Penning this letter recalled the memory of his own appointment as Secretary. It revived Herschel's attention to that walk with Sir Humphrey Davy.[xl] It startled him to note that "patronage", not "canvassing" had prompted Sir Humphrey's remarks. This is clear from a solemn letter Herschel wrote to Davies Gilbert (President-Elect R.S.):

> 27 June 1827. ... "When I accepted the Office of Secretary I assuredly regarded it in no such light, considering myself honoured by the election of the Society to an office so important to its interests and which had been dignified by the tenure of a Hooke & a Wollaston .... I cannot but most deeply lament that such an opinion should exist and offer it as my individual and humble but fixed sentiment, that unless very distinctly disavowed in all future cases the interest of the Royal Society & of Science will suffer materially." ....

Gilbert approved of this forthrightness, and on becoming President he appointed Herschel to be his "Deputy-President" of the Royal Society.

Witnessing to the quiet persistent method of Herschel's approach to a controversy compared with the "forward and busy" way in which Whewell would attack it, here is an extract from Whewell's views during this R.S.election ferment:

> W. Whewell to JFWH. Nov.23rd 1827. - ... I do not like what I hear of the projects respecting the R.S. What possible good of any kind can result from placing Peel at the head of it? I am by no means disposed to take the matter so quietly as you seem to be and I do not know anything more likely to be fatal than the counsel which recommends those who are conscious of meaning right to be silent and inactive while others are forward and busy. I doubt whether the chance of having one's motives misinterpreted is enough to justify this Quietism....."

Added to this "patronage" question, Herschel's opinion on the low personal standard existing in scientific circles he had already stated to Dr. Young. Furthermore to James South he had been very downright on negligent office-holders writing that "if those who hold responsible situations prove themselves worthy of my approbation, they shall have it heartily, if not I shall form my own opinion of them and add my voice to that of the public at proper times & places."

The moral standard of the Fellows of the Royal Society should have given a lead to the received ways of contemporary society, on the contrary there were Fellows who acquired this position for reasons of self-glorification without adding one single original scientific thought to the Transactions of the Royal Society. A laissez-faire, cynical sketch of their little ways was retailed by Fitton to Grahame in Edinburgh. Grahame, a F.R.S.(Edinburgh,) feeling "unco' gude", passed it back to Herschel: "Feb.23rd 1828. Dr. Fitton gave me ..... a precious description of the system of intrigue and criticism that prevails in the Royal Society. I doubt if the very Quakers of Pennsylvania are more prone than your votaries of Science seem to be, to grin at and snap at, and claw and bite each other for anything or no thing."

During these months, life seems a constant struggle to clear the decks of uncongenial hamper, vide Herschel's

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xl. See back p.274

second reply to Lord Brougham in July 1827 who invited & even urged him "in the most handsome & liberal manner" to become Professor of Mathematics in the University of London now in the course of being established. "To teaching, wrote Herschel, I have a positive dislike and would certainly engage in no Office in which it formed any part of the duties expected from me ... Were I to hold the office of Professor I should regard myself as bound to give a course of lectures as complete as my ability would enable me to make them, even were they delivered to empty benches." His integrity is here very much to the fore, it being the practice of contemporary Professors in the elder Universities after having accepted Office & emolument, to leave the duties unperformed. A glaring instance amongst his friends was to be Babbage when he occupied the Lucasian Chair for eleven years and never gave a single Lecture!

A little later on his old Cambridge friends returned to the charge trying to lure him back as Plumian Professor of Astronomy. Clearly in this Chair he could pursue his own line of research and at the same time fulfil the intentions of the founder, so why not take it? Herschel says as much in the draft of a letter to Gwatkin (Prof.) but cut it out to enlarge on the objections. A sensitive conscience and that "truant disposition" always stand in the way: "I feel I should work to more purpose when not compelled to work by a sense of public responsibility ... Besides which I have very many favourite pursuits and I like them all too well at present to choose a Sultana from amongst them .... Perhaps as I grow older I may grow wiser. I love not only beef but also mutton and veal. Why should I live on nothing but beef for breakfast ... dinner ... supper ... and breakfast again? I assure you I find stargazing hard duty enough as it is, without adding to it the sense of compulsion, without binding myself not to quit for so many months in the year and to lecture on its first principles for so many hours in the week."

Dr. Woodhouse's[xl] death in Cambridge certainly occurred at an unfortunate moment. In the present year of Grace, no doubt we should run up in our car from Slough to London, transact some business, then on to Cambridge, deliver our lecture, & so home to sleep at Slough with hardly a thought of fatigue in the doing. In coaching days to add a further engagement to the conscientious performance of all his official duty, even Herschel, that man of boundless energy, might shrink from the thought, and so this friendly attempt failed also.

Moreover to continue as President of the Astronomical Society stood in the direct path of astronomical work.

> He writes to F. Baily: "Every day after Feb.1829 the Meetings fall at that time of the Moon when alone I can prosecute my observations of the Nebulae ..... the great mass of the Nebulaelie in the 11th;

xl Plumian Prof: of Astronomy.

12th & 13th hours of R.A. ... therefore must be observed in the Spring or not at all.

A straightforward choice between "work" and "office-holding" lay before him, these observations being imperatively necessary for his Catalogue of Double Stars, itself a work of international importance.[x1] His election as President in 1827, he confessed to Francis Baily, had caught him unawares also he announced his intention to retire in 1829 in conformity with a previous pronouncement that a President should only hold office for 2 years.

On April 11th 1827 he carried out his duty as President of the Astronomical Society. He presented a Gold and a Silver Medal respectively to Francis Baily (Ex: President 1825-27) and to Lt. W. S. Stratford R.N. (Sec. 1826-27) for a catalogue of the principle Fixed Stars and a Silver Medal to Col. Mark Beaufoy.

His Address (about 5,000 words) is a florid outline of their works pointing out to the Fellows seated comfortably around him in the benevolent frame of mind suited to the occasion, that "only those versed in such calculations can appreciate the soul-sickening labour of such a task."

Parenthetically, we may note that 22 years later his last Presidential Address from that Chair[x2] fully justifies a reputation as one of the first writers to arouse public interest in the study of science. More vivid in style and comparatively brief

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x1 Davis-Gilbert P.R.S. to J.F.W.H. June 28th 1827: "I deeply lament your retiring from the Office of Secretary (R.S.), although engaged as you are in pursuits of the most sublime future and quite peculiar to yourself, one cannot be surprised at your having formed the resolution .... "

x2 In 1849.

it would capture the attention of alert ears surrounding the Chair. In it he avows an "hereditary feeling with Mr. Lassall[x1] and stresses the "healthy excitement of successful exertion."

Though deeply immersed in things scientific, all his own plans went by the board when news reached him of the death of Mrs. Babbage on Sep. 1st 1827. All his thoughts leapt out to his "poor afflicted friend" Babbage. How could he help him? How could he soften the blow? How could he change the current of his thoughts?

Within five days he pounded off by night-coach for Worcester, reaching "The Star Inn", "after a superb moonlight ride" at 8 a.m. A quick breakfast and quick walk out to find Babbage at "Boughton House, the seat of J.Isaac Esq., Banker, Babbage's brother-in-law."

Schemes are discussed, completed, and by next evening he and Babbage arrive by coach in Birmingham, through Bromsgrove and over the Lickey Hill. "Fine view of Malvern Hills," says Herschel.

They had arranged some short visits in Ireland to include a sight of Colonel Colby R.E. with his detachment busy on the first Ordnance Survey of Ireland,[x] and a brief visit to Edgeworths Town by invitation of Miss Maria Edgeworth.[x3]

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x1. "Mr. Lassell cast his own mirror, polished it by a machinery of his own contrivance ..... placed it in an observatory of his own engineering etc." See Essays & Addresses by Sir J. Herschel.

x2 See "The Creevey Papers" Vol II p 215.

x3. See back page 163.

Once aboard the 400 ton steam-packet from Liverpool to Londonderry Herschel of course found the Chart room and pored over the Admiralty Chart of St. George's Channel with her Captain (King) who pointed out several bad errors, e.g. "The Maiden Rock is 2½ miles longer than laid down!" etc. ...

Herschel's Journal gives details of how one landed in those days, at Port Rush.

> "....Two of the passengers were very wroth and got out short of Port Rush in a dangerously small boat. We were landed by a boat which we hailed ¼ ml. from Port Rush where we landed just at dusk and put up at "Campbell's" which is tolerable for sick and tired folk."

Ireland provided fruitful distraction for the mind of poor Babbage. From Londonderry they went in search of, and soon found Colonel Colby, at that very moment re-calculating his base-line of a length of about $7\frac{4}{5}$ miles near Loch Foyle.

Herschel made this scene permanent by one of his Camera Lucida sketches. The long measuring instruments with temporary awnings, the squad of R.E. technicians, including Lieut. Thomas Drummond, all busy with arrangements so strangely rudimentary to our modern eyes.

Six years later, in referring to this memorable date, (13th Sep. 1827) Thomas Drummond wrote to Herschel:

> "Nov. 25th 1822:.. It was thought desirable to re-measure the first 3 or 400 ft. You and Babbage arrived at the very moment when we were concluding the experiment & there was scarcely any perceptible difference between the terminating dots."

General opinion held it to be the most accurate base-line yet measured in the Ordnance Survsys.

Because they intended to inspect the Observatory at Armagh, between 50 & 60 miles to their south-east, they fitted in a visit of one night at the "desolate and shattered mansion of Mr. Hamilton, a bankrupt, (much in the manner of 'Castle Rackrent'), but in a fine situation for a Resident Proprietor." Thence by post-chaise 15 miles to Armagh.

> At Armagh "The Primate Robinson (2 generations back) established here a Library and an Observatory with divers schools and other public-spirited Institutions. He made it a condition in granting new leases in the Town that the Tenant should build a 2-story slated house. They complained and petitioned the Irish House of Peers, but in vain, and thus Armagh became a decent town."

They found the Primate's grandson Robinson, the Director[xl] at Armagh very busy on improvements for housing his instruments;

> "He is certainly a man of genius and of frank unreserved manners & good conversation. His wife is odd in her manner and plain in her person but seems good-natured."

At dinner they met "Dr. Miller, Master of the College School of Armagh .. a communicative fat merry Parson with some humour .... Miss Eliza Miller his daughter (is) a most lovely girl with a sweet smile and eyes, large blue and swimming in softness. .... Armagh Cathedral is very unimposing, merely a decent country church. Visited the Library which is liberally open to all."

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xl. Strangely enough Herschel's own grandson, J.Alfred Hardcastle (Oxford University Extension Lecturer on Astronomy) was appointed Director of the Armagh Observatory in 1917, but his death occurred before he could take up the duties. A plaque on the wall of the Equatorial instrument commemorates this descendant of Herschel.

From Armagh to Dublin, via Newry & Dundalk is on the main coach-road, here the two travellers sat "outside" on the coach through picturesque scenery till at Dundalk they changed for seats inside and to peering out at a cheerless view:

> "Nothing can be more solitary or desolate than the road from Dundalk to Dublin. Flat, ill-cultivated, cottages most wretched. Up to the very entrance of Dublin nothing announces the approach to a Metropolis, it is like the access to Rome over the Campagna and the entrance to the City itself is mean and dirty. Waterford Hotel is in Sackville Street which is the broadest street I should think in Europe, but the splendour of the houses is not corresponding, yet the noble Post Office & the Nelson Pillar before it gave it an air of grandeur ... Walked about the town by the Bank and Trinity College, which form a fine opening (College Green) where is King William's Statue, of Head-breaking celebrity."

Naturally we are expecting to find notes about the Dublin Observatory and the Irish Royal Astronomer but there are none for they were doubly unfortunate in finding neither Dr. Brinckley nor Dr. Rowan Hamilton (his successor) in Dublin. Dr. Brinckley had already retired and Dr. Rowan Hamilton was over in England. To see the Observatory under such conditions would be "seeing the play of Hamlet with Hamlet left out." Later, this ill-chance reached the knowledge of Dr. R. Hamilton through a note from Dr. Robinson of Armagh, he wrote without delay on 12th Oct. 1827 to Herschel regretting very much his own absence from

The Heavens declare
The Glory of God.

This tablet erected in 1793
was restored in 1915
in dear memory of
Joseph Alfred Hardcastle.
(Director of the Observatory. A.M.S.)

Dublin and adding the hope that "we shall always regard one another with friendly feelings if you will permit one so young and untried as myself to call myself the friend of Herschel".

Babbage & Herschel drove off for their stay at Edgeworthstown leaving Dublin perforce unfinished. Herschel's pen seems to have failed him during the crowded hours at Edgeworthstown. There is not a word about the place or Miss Maria Edgeworth or any members of that celebrated coterie. Just a note that they spent two days at Edgeworthstown after which they disappear abruptly into the blue, reappearing at Howth on Sep. 28th to go aboard ship for England.

Herschel's journal of the tour ends with graphic touches about their passage to Holyhead:

"Sep. 28 1827: Under way for Holyhead. It was a thick calm fog. Ten miles out at sea observed a heron, so it must have lost its way, in the fog he must have been drowned, they being bad swimmers. A lark was our constant companion. N.B. They have no rule when two steamers meet suddenly which side to take unless one or both have sails. The Captain wrote to Freeling to represent the danger. No result."

In Herschel's great packet of correspondence from Grahame probably lies the key to the new phase dawning on Herschel's life in 1828.

The key to the new phase dawning on Herschel's life during 1828 probably lies in Herschel's great package of correspondence from James Grahame. Grahame's five years of marriage brought him so much happiness that he always longed that Herschel could understand it, he constantly harps on matrimony in these letters, he tried every string.

He urges Herschel with a friendly goad. The usual chaff on the subject fails - and his letters become more and more concerned.

Suppose his melancholy predictions come true? His persistence continues, in one letter he writes:-

> "I fear for you that you may acquire solitary habits. It would shout new life into me to hear you were going to be married to an amiable woman and in the way of learning what it is to love and be loved by our own children."

In the spring of 1827 he invites Herschel for a short visit, but Herschel was overworking and brushed the topic aside. Overcome but unbaffled Grahameretorts in sarcasm:-

> "I suppose you <u>are</u> writing me from Devonshire Street and not from Newgate?"

Then Grahamelets himself go in some vigorous writing:-

> "This is a hopeless subject. God grant that your escape from the infernal frying-pan in which you are voluntarily consuming yourself be really as near as you imagine and that when it comes it may not be a day too late."

He even adopts the croaking tone:

> "You are now in the bloom of manhood with that susceptibility of adapting yourself to a female companion which is one of the advantages which the 'anni varientes' carry with them and carry away! If you wait till the 'anni recedentes' draw near you must either live in cheerless celibacy or find marriage a voyage against wind and tide ... I seem to be coaxing a perverse child to be happy." .. "I wish you would join us at Hastings; it might give a domestic bias to your hopes and feelings to see how happy I am with my pets."

With parental cunning Grahame adds anecdotes about his little girl aged 12 who has announced: "Papa, I am quite determined to marry Mr. Herschel, because I am sure you could not love him unless he were a very good man." and another about her wild joy over the white mice which "kind Mr. Herschel" had sent to her at her school: "Matilda is in raptures with them and sends me rather tedious bulletins of their health and diet ... etc."

These attacks were not followed up in person. Doctor's orders sent him out of England in search of health. He settled at Nantes on the Loire and continued the attack in urgent letters about his Edinburgh friends, Mrs. Stewart and her large family who had migrated to Nottingham Place in London. But before going to Maules himself He previously prepared the ground. Besides vouching for the whole Stewart family of six sons and two daughters and for the late Rev. Dr. Alex: Stewart he personally introduced Herschel now living in that hired house in Phillimore Place, only a pleasant stroll ~~away across the~~ Park, or a short country drive round Campden Hill.

Instinct seems to have told Grahame that his crafty schemes would succeed this time for Herschel actually travelled down to Southampton to speed him on his voyage and made, late at night, a sensational entry in his private diary describing their romantic farewell on that early autumn evening. Herschel, the silent, the reticent, is fain to write:

> "Sep.22nd 1828. Rowed by moonlight to Netley Abbey, where passed an hour in a close and whispered confidence in the main aisle under the ash trees, with the stars looking in above. An unearthly scene!"

They parted on their several ways per coach and sailing vessel. John took the coach back to London and Grahame crossed to Nantes.

What sort of divinity was this Miss Margaret Stewart? Every point John sought for bid fair to be fulfilled in the charming chestnut auburn-haired girl with eyes brightened by intelligence and sympathy, so attractive and handsome. In fact, report has it that Margaret and her sister Isabel were "the loveliest girls in Edinburgh". Her six brothers, young men of parts, were equally blessed with the Stewart hair and by charm of manner.

Margaret Brodie Stewart's portrait painted when she was ten years old shows a well-favoured child gifted with a pair of espiègle eyes and the reddish-auburn hair of a Stewart.

More than that, when only six years old this "wee girlie" possessed a captivating little manner irresistible, even in lesson-time, to her father. He entered in the pages of his diary – an otherwise pious collection of thoughts, in other respects a collection of pious thoughts the following reflections one evening in April 1816:

> "April 1816: My favourite pupil, Margaret. – I think it of importance not to push her through the rules of Syntax too rapidly ... Margaret is indeed a willing scholar, but sometimes requires care to keep her attention engaged and to keep her in lively spirits. I find nothing so effectual for this purpose as allowing her to embrace and kiss her dear Papa at every little pause or conclusion of a small portion of the exercise. Hence her Latin task has come to be distinguished by the name of the "Kissing Lesson". She is very earnest in claiming her kiss, sometimes rather unseasonably in the middle of a Rule or an Example. When I told her this evening that she was but interrupting and hindering herself with too frequent kisses she immediately answered: 'But is not this the kissing-lesson, you know, Papa?' She listens with avidity and then almost involuntarily spreads out her little arms and throws them about my neck ... " xl

And yet even in the history of this delightful family, official patronage still dogged John Herschel's path. Dr. Stewart's wife chanced to be a great-granddaughter of the Earl of Wemyss and also first cousin to Elizabeth, Duchess of the 5th Duke of Gordon. So it happens that, through this connection "a distinguished nobleman, to whose lady Mrs. Stewart was nearly related, having waited on the King in person, readily obtained for Dr. Stewart the Royal Patronage" xl as Minister of the First Charge at the Canongate.

Under the stress of John's present excitement he could well overlook the universal method of obtaining position by patronage, for Dr. Stewart was in point of fact a most suitable presentee and well-known for his integrity and candid piety, he was the author of a volume of Sermons besides having written the earliest Gaelic Grammar and, at the request of the Highland Society, having deciphered and translated Ossian's Works. xl

Margaret Stewart's education in every respect was of a very high standard.

Besides the Latinity imparted by Dr. Stewart, her mother Emilia Stewart, encased in all her Highland dignities, instilled personal deportment in the strictest manner of the 18th century. She conducted the courtship of her daughter by John Herschel in stately decorum with the utmost etiquette, she herself being the intermediary. And yet occasional lapses of vigilance occurred as when John was received, in spite of Mrs. Stewart's indisposition, he having called to return the loan of a book from Mrs. Stewart. Now the young people in her absence threw aside their reserve, we read of singing and flute-playing accompanied by Margaret.

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xl Extract from 'Memoirs of the Rev. Alex. Stewart, D.D.' by Dr. Sievewright 1764-1821. pub.1822.

xl ([illegible]). See 'The Greevey Papers' Vol II p103.

Events seem to have taken the usual happy course for some weeks until more high spirits become the prelude to a formal courtship by John. who was 20 years older than Margaret and now sure of his intentions.

An unbelievably formal correspondence with Mrs. Stewart admitted Herschel to the next step. He received permission to address his hopes to Miss Margaret Stewart by letter enclosed in a communication to her Mother! Next day he received Miss Stewart's non-committal reply beginning:

"My dear Sir, It was indeed with the feelings of the greatest surprise that I received your letter..."x1

This impending change in Herschel's outlook on the future threads its way through his diaries in 1828 and 1829x2 where at first the entries are chiefly of scientific memoranda and appointments, then more and more frequently his private engagements are concerned with the Stewart family. At last on the 3rd of March 1829 he sets down in the Latin tongue, as though awed by his own temerity, the statement that his marriage with Miss Stewart has taken place.

No doubt the following letter to Patrick Stewart in the November of 1828, (from his lifelong friend James Grahame) had already reassured the whole Stewart family regarding the 'bona fides' of this philosopher who moved in an atmosphere differing 'in toto' from the religious circles of the Scottish capital.

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x1. This correspondence will be found in Appendix.

x2

"James Grahame to Patrick Stewart,
Nantes, France. 29th Nov.1828.

... I have known Herschel since the year 1810, have lived at College with him, travelled with him, corresponded with him and nothing can exceed the intimacy with which we have exchanged our souls. I consider him a man of pure untainted morals of the highest integrity, generosity and honour. His tenderness to his friends and relations I have repeatedly witnessed and experienced. His genius is of the very first order. It is united with excellent taste and, as the Emperor Napoleon said of a particular individual: 'in him the heart warms the genius instead of the genius withering the heart.

"He has a good fortune of his own - what it is I don't know but it is sufficient to enable him to dispense with all other fortune except virtue, in a wife. His mother has also considerable substance of her own to which he will succeed. His notions of female character and merit are equally just and refined. I believe him a Christian - though I have often wished that his views of Christian doctrine were more distinct. They seem to me latterly to be acquiring more distinctness - and frequently I have thought 'With an elegant and Christian wife that man would be perfection', for devoid of that domestic happiness which he is so well formed to confer and partake, and making a substitute for it in the intense pursuit of science, he has hurt his manners which have contracted an involuntary reserve and abruptness. He was contracting such an exclusive devotion to astronomy that if his celibacy had lasted 5 or 6 years longer I doubt whether he would ever have had leisure to think of marrying. He has an excellent constitution as his excellent father had before him .....
.....If Margaret were my daughter I would say to her, "My dear, you have gained the attachment of one of the best and most admirable men in England. If you can love him, I will venture to predict, as far as mortal foresight may, that you will be a happy woman." What more can I say? .... etc. etc.

James Grahame."

Completing the picture from the opposite point of view, here is Miss Mary Baldwin's description of the Stewarts' looks and virtues in a letter treasured up by Aunt Caroline Herschel in Hanover, always hungering after news about the

future happiness of her beloved nephew. What then must have been her joy at finding that this letter actually ended in a postscript from John himself overflowing with rapture and exclamations at the "miracle of happiness" that has dropped upon him?

"Miss Mary Baldwin to Miss Caroline Herschel.
Feb. 7th, 1829

..... I am the happy guest of dear Mrs. Stewart the widow of Dr. Stewart a clergyman, one of the most worthy excellent beings, well known and respected, lov'd and admired as a man of the highest talents and attainments and most exalted worth. Mrs.Stewart is one of the sweetest, most gentle of women, possesing a highly gifted mind, her two daughters have never been from under her maternal care and they are all the fondest Mother can wish or desire. Margaret, the eldest, was 18 last August, though young there is a dignity of carriage which gives the appearance of her being 25, her face is that of a Hebe; a short upper lip, eyes of the finest shade of hazel, beautifully shaped, an ample forehead. indeed I think her brow the most beautiful I ever beheld, it is a Grecian face. She is tall and most gracefully formed and with all these personal charms her temper is sweetness itself; a powerful mind early trained and highly gifted and cultivated. In fact she appears to have been born to make the happiness of your beloved Nephew..... She is an angel upon earth, never having been allowed to mix in the world, the simplicity of the dove is united to wisdom so admirable that the beautiful combination forms a character that each succeeding day surprises and delights with some new light. Cannot you imagine the adoration such a being asyour dear Nephew feels for one such as I have attempted to describe.
... On the 3rd March the indissoluble knot is to be tied ... Mrs Stewart lives close to the new Marylebone Church and there the ceremony will be performed by Dr.Jennings, who feels a father's affection for the dear girls. The youngest, Isabella is 16, the playfulness of her perfectly lovely face is a fine contrast to the dignity of her sister. There is a picture of Northcote's now exhibiting in London of the Adoration of the Shepherds in which the Virgin holding the Infant Saviour is very like the beautiful Isabella but not so handsome. Mrs.Stewart has been, and still is, a very pretty woman; she is first cousin to the present Duchess of Gordon, who was a Miss Brodie of Brodie in Scotland. No rank or high connection can add to happiness founded, as my Cousin's and his adored Margaret is on a just appreciation of each other's superior worth, yet I have thought it right to mention this to you... My Cousin resigns the Presidency of the R.A.S. on Friday the 13th next Mr. South is to succeed him ... A dreadful fire has destroyed the beautiful Minster at York.....
(...affectionate M. Baldwin.)

(On the same sheet).

"J.F.W.H. to his Aunt Caroline Herschel.
Dear Aunt,
All that my Cousin says about my dear sweet Margaret is mere namby-pamby. She is a being like no earthly beauty or virtue. A higher order of intellect and goodness animate in her a form almost more than mortal mold (sic). Talk of Grecian profiles and foreheads. There is not a Grecian block that ever was chiselled that would not be honoured by being said to have caught a ray of her loveliness. She loves me much, but God more, for the purest and loftiest religion has fixed its seat in her heart. It is a miracle of happiness that has dropped upon me. She admires you and you must love her for my sake.
Your happy and affectionate nephew
J.F.W.Herschel."

Their wedding took place at St.Marylebone's Church and that very afternoon Miss Mary Baldwin hurried off a detailed artless description of her busy cheerful day to Aunt Caroline Herschel.

Miss Mary Baldwin to Miss Caroline Herschel.
Mar: 3rd, 1829.

"....I hasten to tell you I have this morning had the happiness of witnessing the marriage of my dear excellent Cousin with his beloved angelic Margaret .....
You will like I know to hear all particulars of this

most interesting event, I shall therefore be as minute as possible. I went to Mrs. Stewart's the Monday to be in readiness, as one of the Bridesmaids, the younger sister Isabella was to have been one, but being very liable to take cold, her Mama was fearful of her going out so early in the morning. The happy bridegroom with my brother and Mr. Whewell[xl] a Cambridge friend awaited us in the Vestry of the Church. The lovely bride was led to the carriage by her Guardian a Mr. McIntosh, who gave her away. one of the Bridesmaids, a Miss Small, a cousin of dear Margaret's and a Mr. Charles McIntosh (also a cousin) went in Mr. McIntosh's carriage. my Aunt's followed with the second Miss Small and your humble servant. Margaret's two brothers and a nephew of Mr. McIntosh's formed the remainder of the party. Dr. Jennings a dear friend of the Stewarts was the clergyman, he performed the ceremony very impressively.

The happy pair got into a new travelling carriage and proceeded to Nottingham Place where the rest of the party followed and partook of an elegant breakfast. My brother and I left the table quietly and came down to Kensington in my Aunt's carriage and were in readiness to receive the Bride and Bridegroom and present them to their dear Mother who gave them the maternal blessing. A quarter before twelve they took leave and proceeded in their travelling carriage and four grey horses on the road to Buckingham. A ladies-maid and manservant accompanied them."

And so they drove away from Kensington on a seven weeks' honeymoon, having the ladiesmaid and man-servant up behind them in the rumble and four greys for the first stage.

All the romance in Herschel's nature must have inspired his thoughts in the plotting out of this tour round the west of England, he seems to have planned that during their happy weeks until April 20th they should drive in a typical English countryside amongst the slow growth of advancing spring, ~~budding~~ the green tracery glistening in the sunlight and the sap rising to the branches overhead. They would pass through Buckinghamshire, Warwickshire, Worcestershire, Herefordshire, Gloucestershire. The very names of these counties call up pictures of far-off blue mountain-ranges, of hilly, wooded districts where rooks caw and circle over passing carriages, and of broad meadows crossed by slow canals. Pictures too of red earth veiled by the young green of well-sown crops beyond the budding hedgerows where the songs of birds fill the air. These are very different scenes from the bleak Scottish mountains of Margaret Stewart's earlier home.

At Leamington Spa they put up at the Regent Hotel for about three weeks to explore the neighbourhood, including Guy's Cliffe. Unfortunately this visit fell rather flat (Mr. Percy Greathead having died in 1826.) They were merely shown round and "a portrait of the celebrated Dr. Herschel" was pointed out to them.

Beside these ways of killing time Margaret Herschel's letters to her home mention that Herschel had brought with him the first manuscript copy of Mrs. Somerville's book "The Mechanism of the Heavens" written at the request of Lord Brougham for his new publishing Society: "The Society for Diffusing Useful Knowledge" and now being submitted to Herschel for his views.

His views were appreciative and full of a generous enthusiasm. Mrs. Somerville in her autobiographical notes

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xl. J.F.W.H. to W.Whewell. Feb.1829...."The friendship of no short standing & I may say of no ordinary warmth that subsists between us lead me to believe that you will indulge me in a wish to have you near me on the occasion that is to make me happier than you or any other of my best friends can have ever hoped for me. I shall be married on the 3rd of next month to the most angelic of God's creatures. Do give us your presence on the occasion...."

says:

> "I was very nervous whilst it was under examination and was equally surprised and grateful that Sir John Herschel, our greatest astronomer and perfectly versed iversed in the 'calculus' should have found so few errors. The letter he wrote on this occasion made me so happy and proud that I have preserved it."

In that letter he wrote on March 29th 1829:

> "....I have read your manuscript with the greatest pleasure & will not hesitate to add (because I am sure you will believe it sincere) with the highest admiration. .....What a pity La Place has not lived to see this illustration of his great work! You will only I fear give too strong a stimulus to the study of abstract science by this performance....."x

Whewell, Herschel's "best man", seems to have presumed about a week later that Herschel would now be ready again for serious thought and wrote on March 8th 1829:

> "... I should like to ask you to look over a sheet of chemical elements which I am going to print and which I want to arrange as a basis for a mineralogical arrangement....."

Herschel's Diary, dated a month later, states:

> "Wrote to P. Stewart, enclosed a letter to Whewell with his Chemical & Mineralogical Tables."

These Tables do not seem to have aroused Herschel's enthusiasm at that time.

Margaret & John filled in many hours with the Camera Lucida, a favourite scientific "toy" on all Herschel's travels. Many of the sketches during these days are bound up in the five or six stout volumes of all the very beautiful pencil pictures drawn by John Herschel.

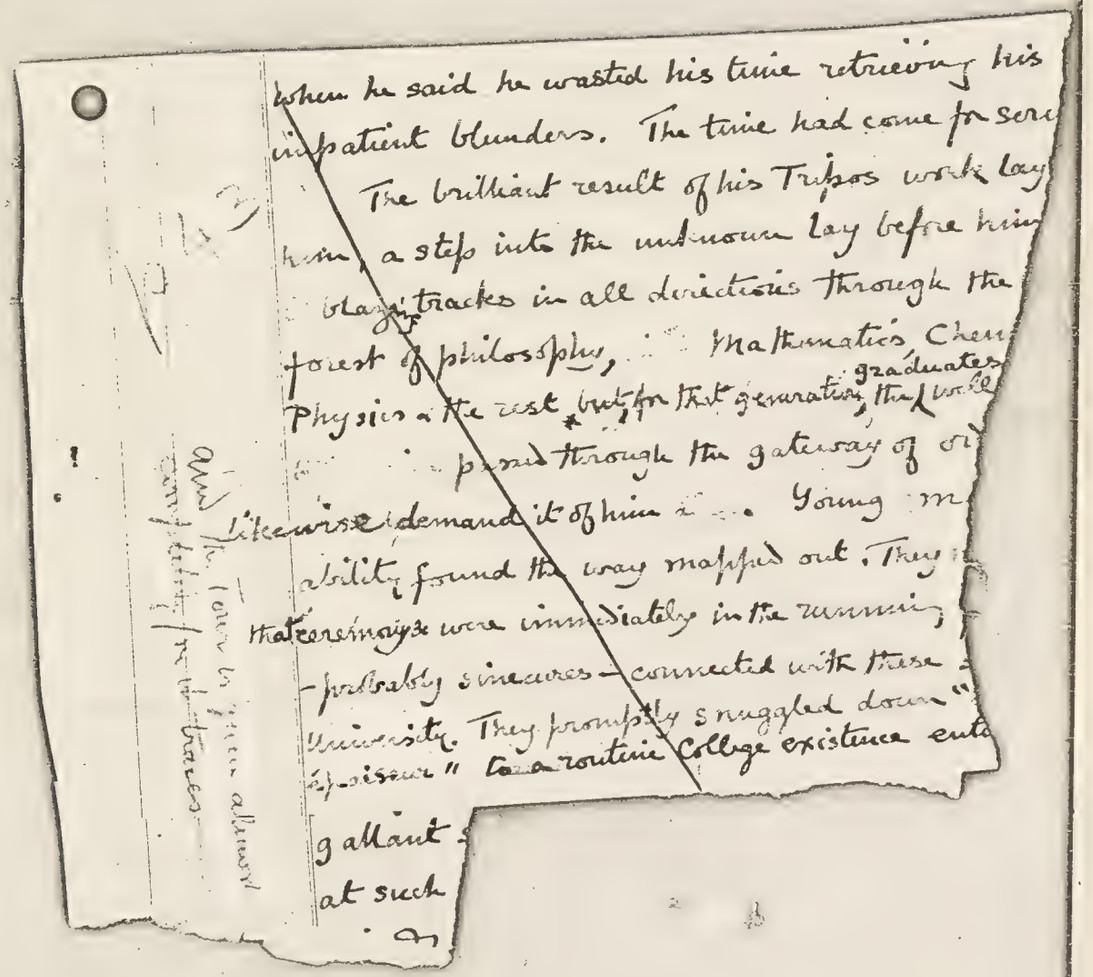
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x Personal Recollections of Mrs. Somerville by Martha Somerville (pub 1885) See Appendix.

The whole journey is somewhat reminiscent of those early travels with his parents as regards visiting manufacturing plants and so forth. There was Phipson's Pin Manufactury near Birmingham and then there was Thomason's Works. After this visit Herschel notes curtly "Thomason is an ass"! (with no clue to this comment!) They declined to go out to dine at Soho with Mr. Boulton, the partner of the late James Watt, but they did go to see a Chloride of Lime Works and the Union Glass Works, noting in the latter manufactury that "the red glass for cut glass is a thin sheet of red between two thick ones of colourless flint (glass, Ed.) this gives the equality of colour."

Driving on to Worcester they lay for a few nights at the Hop Pole and saw Flight & Wan's Porcelain Works, (because Herschel himself had already seen the famous Worcester China Works), but during the visit they drove across the Severn and over Powick Bridge to stay one night at the Foley Arms in Great Malvern ("a very neat house & decent accomodation"). The exceptionally clear weather, providing a wide outlook from the Worcestershire Beacon, combined with the infection of Herschel's enthusiasm urged them at full speed up the turfy hillside. Herschel wrote in his Diary:

> "From Hotel door to top 20 minutes, and back 13 minutes. Loitered on the way at top. Noble view!! Red Sienite Rocks."



when he said he wasted his time retrieving his
impatient blunders. The time had come for seri
The brilliant result of his Tripos work lay
him, a step into the unknown lay before him
blazed tracks in all directions through the
forest of philosophy, Mathematics, Chem
Physics & the rest but for that generation, the whole
graduates
passed through the gateway of or
likewise demanded it of him. Young m
ability found the way mapped out. They
that ceremonies were immediately in the running
probably sinecures — connected with these
University. They promptly snuggled down
"respicisse" to a routine College existence enti
gallant
at such

Herschel was more accustomed to climbing with Coutet than with a young lady consequently the next evening, after a lengthy service in Worcester Cathedral he notes:

> "Sunday Ap.5: In evening Margaret complained much of headache etc."

and by Wednesday having been caught in the rain on arriving at Cheltenham she "complained of cold and sore throat and kept her room all the morning. A vile rainy day."

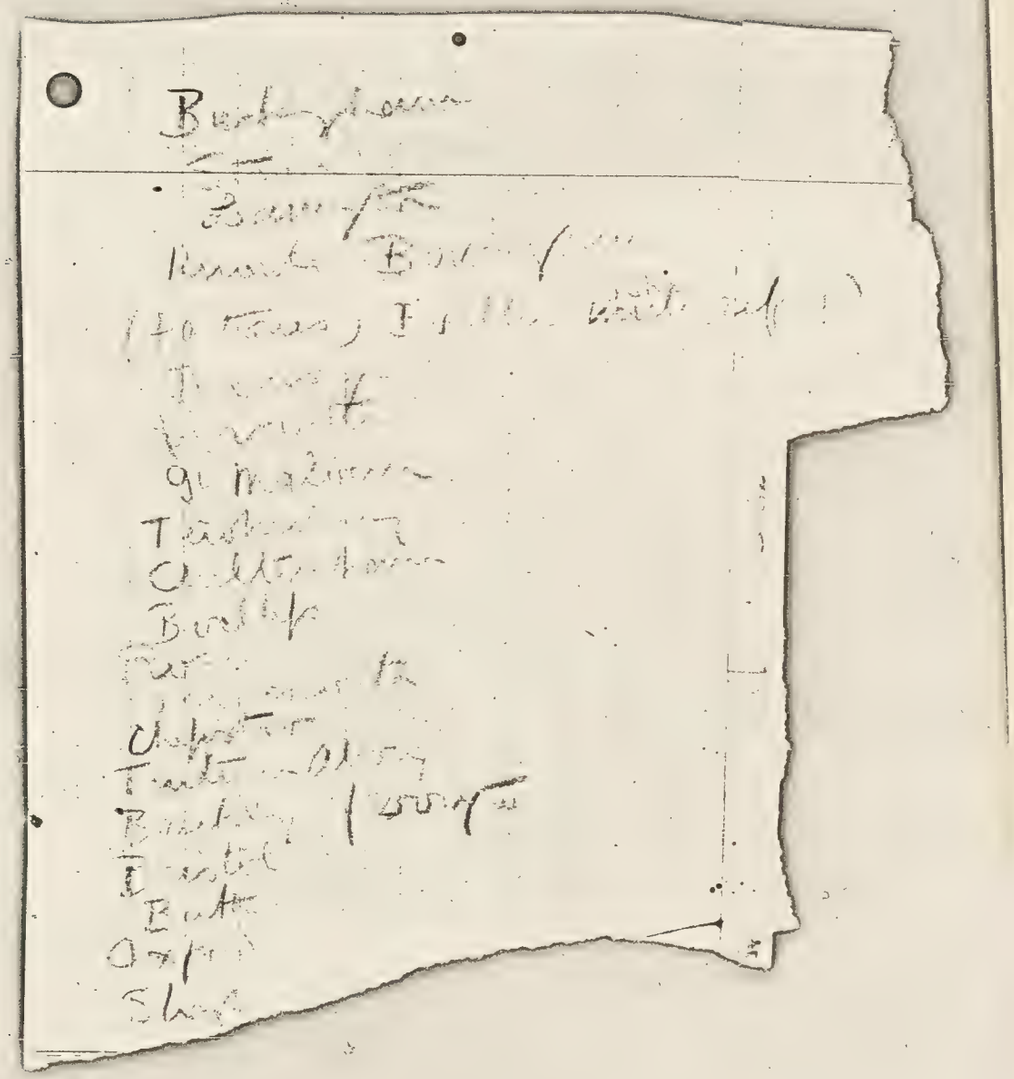
At Cheltenham Herschel fastened on an odd anecdote. Calling on a Mrs. Jarvis she told him that her "little girl asked "Who nursed Adam?" and when her Mother read her the history of Cain & Abel she asked: "But, Mamma who saw it?" then recollecting: "O, now I think of it God saw it"| This is the first note recorded for its psychological interest by Herschel. As we shall see, his interest in child-study & his knowledge of the subject grew to the extent that within 8 years his principles stabilized the Educational Code at the Cape of Good Hope.

After a week in Cheltenham at 9/6 a day, they drove away on April 14th well satisfied with the Imperial Hotel.

> "Charges very moderate, there is a reguler charge for waiter and chambermaid & they expect nothing extra."

Their itinerary picked out the most romantic and round-about drive home, Herschel not intending to reach Slough until April 20th. His notes are graphic if short.[xl]

xl Except for geological memoranda, here omitted.



"At Gloucester saw superb Cathedral, cloister!! Whispering Gallery, flying arches. - To Ross & Monmouth. N.B. The old Red Sandstone!! The Wye from Ross to Monmouth!!! 15th Took horses to Goodrich Castle, a noble ruin - The Vale of Ross!! Took a sketch while Margaret gathered violets and wild flowers. To Chepstow. Down the Wye to Tintern Abbey. (Belongs to Duke of Beaufort who is sustaining & restoring it.) Saw Castle at Chepstow. N.B. Bridge! Tintern again by bright moonlight. 17th (Good Friday). Attended Divine Service at Parish Church. a Mr.Davis (a dandy parson) did duty." Then drove by Beachley across ferry by steam[x1] to Aust Passage House. Bristol ... Bath. 18th Bath to Oxford, 19th Oxford. 20th April, Slough.[x2]

This return home with his wife was merely to catch up his arrears in London. Herschel intended to live through a glorious summer showing his wife the continent of Europe. They were to start again within a month. No time to be lost. His Mother had the pleasure of his presence at Slough for a fortnight. Next they drove up to Nottingham Place in Ives's chariot. "May 7th Nottingham Place. Arrived 5 p.m." And so Mrs. Stewart possessed her daughter again for a time.

Herschel's duties as President of the Astronomical Society took him in every direction, notably to help Babbage about his intricate Calculating Machine. The financial sacrifices Babbage is making for its construction being excessive in a private individual. Herschel called togetner an urgent conference with Babbage at Nottingham Place. Six Fellows of the Astronomical Society, the Duke

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x1 About one mile across the Severn at this ferry.

x2 Lady Herschel continued to live with him at Slough till March 1st.1830 when she took 10 Park Street Windsor, where she died 1832.

of Somerset, Lord Ashley, Sir John Franklin, Dr.Fitton, W.W.Whitmore, M.P., F.Baily & Herschel met him & decided to apply to the Prime Minister, (The Duke of Wellington) for further public funds. Whitmore (brother-in-law to Babbage) and Herschel (President A.S.) being deputed to wait on the Duke next day. Their efforts bore fruit in the following year.

Now Herschel hurried his wife back down to Slough, by one of the many coaches running down the Great West Road, to prepare for her adventure across the Channel. They hoped to drive over the Alps to Italy perhaps even to reach Rome.

At last the great day dawned. On May 22nd they rumbled up to Nottingham Place, again in Ives's chariot. Thanks to Herschel's journal and packets of their letters still available, we easily follow them on their tour in their own carriage & post horses (after a vexatious preamble) across Belgium & onwards until the abrupt termination to all this happiness.

> May 22nd 1829. "7.25 p.m. Quitted Nottingham Place with Margaret and John Stewart[x1] and M.'s maid Tucker, with 15 Packages ticketed and numbered, 3 cloaks 2 umbrellas and 2 great coats, per Ives's chariot and Hackney Coach, (No.343). I had engaged a Courier, Henry Bull, at 9 guineas per calendar month, but was obliged to dismiss him this morning for drunkenness and absence without leave for a whole day after it.
>
> "8.25 p.m. Reached the Ship Tavern in Water Lane. a queer looking place. Barring Tobacco, a sawdusted passage and a Bar where Ale and Spirits are sold, all the accommodations are decent..... Settled Bill overnight."

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x1. John Stewart (Chairman Ottoman Bank) 1814-188-. Mrs Herschel's youngest brother.

After a very brief night's rest "embarked our baggage & selves without a tenth part of the confusion and torment we should have had in the daytime."

At 2 a.m. a row-boat with the Herschel party on board pulled out from the Stairs at Water Lane for the "Lord Melville" steam-packet into bright moonlight with a starry sky overhead and, below, the lights from London Bridge throwing long reflections on the glassy water.

> "Got under way at 3.7 a.m., a splendid morning, the moon going down and a lovely dawn but delayed about 1½ hours whilst boring our way through fog-banks in the Thames. At one part in the course the river's

level is decidedly above the flat land and is kept out by embankments."[x1].

At the mouth of the river, the boat began to toss a little. Mrs. Herschel wrote of the crossing to her Mother:

> "Poor Herschel went down to stretch himself in the gentlemen's cabin, whither of course I could not follow as there were others in the same predicament."

However on deck she passed the time with Sir Robert Inglis,[x2] (M.P. for Oxford University). They discussed Milner's Church History and the Port Royalists. She soon discovered (and told her Mother) that he was "a decidedly religious man."

Once landed in France her sharp young eyes searched for foreign ways to retail in the weekly letter to her Mother on this, her first journey abroad:

> "The first thing decidedly French I noticed was 3 women towing a boat along the pier."

Next day it was the black silk cloaks and white caps of the bourgeoises which she noted and that:

> "the ladies dress much like the 'dandizettes' at home with petticoats up to their knees, sometimes threatening a display of their garters."

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x1. ~~In 1840~~ Eleven years later the high tides up the Thames excited much alarm. The Times Aug. 11th 1840 states: 'When sailing down the Thames ... few people are aware that they are borne upon a flood of waters several feet higher than the surrounding country ... raised and supported between banks of stupendous construction ... In the early part of last century the Thames burst its bounds ... with a terrible inundation ... The site is still called Dagenham Breach."

x2 Sir R.H. Inglis Bart M.P. [President Brit: Association 1847.]

Herschel wrote that:

> "This day being Sunday, attended Divine Service at the English Chapel performed by a Mr. Liptrap. Well attended. The Congregation mostly French. Read part of Luther's Life with Margaret.

Mrs. Herschel soon had an inkling of her husband's bugbear through life for she told her Mother that:

> "Herschel was too tired to look for a carriage last night and there is no Act of Parliament against our remaining here all tomorrow to prevent his overfatiguing himself."

However he bought a carriage: "intermediate between a calèche and a landau" and they posted off from Calais in a storm of wind and rain. They had with them the maid Tucker, "who rubs on most uncomplainingly" and Johnnie Stewart, youngest brother of Mrs. Herschel who, like any boy was all agog to see the new machines. He induced his big brother-in-law to take him down into the engine-room on the steam-packet and then entertained them all at dinner with a full explanation: "which astonished me" wrote his sister, "and gratified Herschel."

In his Diary Herschel is always precise in noting the time; he says:

> "May 25th, 5.2 p.m. Reached St. Omer. Saw the Nuns of St.Ursula at Prayers. Struck by their neat and simple, but majestic, dresses and deportment. Black flowing robes, black veil, white fillet across forehead, kissed the ground after prayers, made genuflexion and retired. Saw the ruined Abbey of St. Bertin. It was sold in the Revolution to a

contractor for the materials, but the Tower and much of the Hall remain. The four central arches whole, exactly as in Tintern. The Duchesse de Berri saved the Tower as it was to have been pulled down lately."

Heading for Brussels they drove over the Cassel hill seeing one of the richest parts of France stretched like a map at their feet.

On crossing the frontier into Belgium near Lille Mrs. Herschel wrote in her innocence:

"All our baggage was taken off the carriage and searched; I had never seen the process before and certainly it appeared to me a very impudent thing."

Then Herschel remarked that:

"Passports had to be shown to get post-horses at Lille. As soon as we were out of the town we observed on our right a mighty army of windmills all at work. Counted 88 in a bunch. They were innumerable. 'Don Quixote' would here achieve tenfold immortality."

From Ath they started early thinking to explore the field of Waterloo but the post-horses being Government property might only run the one line of road straight to Brussels. Near Ath, Herschel reported:

"... here began the usual system of fractures over the confounded pavé"

and at Enghien they had

"to adjust by a rope the 'penchant' of the carriage to sway to the left"

A spring had given way. They softened their disappointment by attending the Opera at Brussels that very evening! Herschel states that they stayed at the Hotel de Bellevue in the Place Royal, "literally next door to the King of the Netherlands, being contiguous to the Palace" ... They were most enthusiastic travellers for Herschel adds,

"Johnnie and I have been up at 5 this morning taking drawings of the Cathedral .... We are just returned from a cold and dusty ride to Waterloo. The place is quite changed[x1] - The 'Wellington tree' is rooted up and sold to an Englishman to be planted in England. The whole surface of the space on which British squares fought is dug away to the depth of six or eight feet (bones, bodies and all) to make a huge cone of earth, surmounted by a colossal bronze Lion pointing out the spot where the Prince of Orange (now King of the Netherlands) received a wound in the Battle.

"You can imagine nothing so beautiful as the Forest now is. A belt of trees growing to an enormous height, over 40 miles long and 6 miles broad, all intersected with narrow paths and dingles full of wood. It is the old 'Forest of Ardennes', and by paths more or less devious, one may pass to Hal or Louvain.

"A peasant still living there,(it being only 14 years after the Battle) pointed out those details and described how he and seven other men lurked on their farms throughout the battle protecting their goods, after their wives and children escaped into the Forest of Soignies.

"This man had been employed for 8 days after the battle burying the dead and feeding wounded. He found wounded men alive after the fifth day. They burnt 700 bodies at Hougaumont by way of experiment but it took so much time and so much wood that that would not do. In one hole 2000 were buried. There is no monument to mark the spot, though surely 2000 privates must pass for one hero? ...

"Next day we took a calèche and went agipsying in the Forest of Soignies in a place called Boisfort where we succeeded in losing ourselves in the

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x1 Since Herschel's visit in 1822.

magnificent woods of tall beech and elm. Some of the former are from 10 to 12 feet in girth and nearly 60 ft. to the first branches. We dined here al fresco off cold meat and eggs and champagne (taken in moderation be it understood) and after a good ramble among the pathless but delightful and easily penetrable woods and wilds returned home in the evening."

On Sunday the Jubilee celebrations in the Church of Sablon took place. Mrs. Herschel, Presbyterian though she was, capitulated to the overwhelming harmonies and felt

> "it was not difficult to imagine that the air around us was full of the Heavenly Host singing praises to the Highest. Devotion it could not be called but mere sensual gratification on the part of the hearers ... The service concluded at eleven and we went to our own simple chapel which lost nothing by comparison."

Religious scruples postponed a dinner invitation with M. and Mme. Quetelet[x1] till next day, but Herschel writes:

> "Walked out with Quetelet to the new Observatory, a fine commanding position on the Scharabeke Road. It is a massy brick building. The Salle de l'Observatoire has a 'massif' of brick for pillars. There is to be a Transit Circle and a Mural by Troughton. Saw the splendid 'Flora Batava' of Dr. Blum now lithographing by members, to contain 3000 new or imperfectly known plants. Went to Jardin des Plantes. Introduced to M. Maens and M. Drapier, two of the chief Directors. It pays 4½ per cent. The King is a shareholder. Dined at Quetelet's... The Observatory not being finished, Q. inhabits a small house out of the Scharabeke Gate... Had a little talk with Q. and Verlust about my 'Light'[x2] which they are translating."

Mrs. Herschel found the Quetelets delightful people. She tells her Mother: "Madame is young and handsome and enters with interest into all her husband's pursuits without any of the flippancy or frivolity of a Frenchwoman." This dinner-party received Mrs. Herschel's attention as she stored up its details for her Mother. They sat down at 5 o'clock, a party of eight and she writes:

> "The shortest time a French dinner can consume is 2½ hours; it comprised soups, removes, corner-dishes, joints, puddings and jellies. If possible, you were to try each dish, after which came the dessert with all sorts of little cakes, little comfits, little everything."

> Ladies and gentlemen "don't drink wine with each other .... the gentlemen leave the room along with the ladies."

The conversation of one of the guests, Baron de Keverberg[x1] thrilled her compassionate mind, she tells her Mother how, with General van Bosch Governor of Java he

> "concerted a plan for alleviating the miseries of the poor in Holland and the Low Countries by colonizing a barren piece of Holland granted to him 18 years ago at Hoegstraaten. Provision is made for the aged and infirm and the children are educated, taught habits of cleanliness and industry and set forward in the world." ×

So enthralled were the Herschels by the topic that the Baron had to return with them to Brussels and talk on far into the night. None of the party could speak English, her lame French was obliged to serve her for want of better, though she was fully conscious of its imperfections.

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x1 L.A.J.Quetelet. 1796-1874. Director of Brussels Observatory.

x2. Opus 58 Encycl: Metrop: "Light". See back p.284

x1 See back p.p. 152 & 177 Friedrich's Ort

Late to rest and early to rise, they set off next day for Namur. Travel-worn and nervously exhausted, Herschel wrote of their arrival to his Mother:

> "Broiled with sun, peppered with dust, dirt in eyes, nose, teeth and clothes, horrible to ourselves and laughable to everyone else we arrived at Namur.... It is a queer place overhung by strong batteries. Johnnie and I walked up the height opposite the Town Gate, where there is an old neglected outwork. It is a nasty town and we were glad to leave it. A horrid roar of bells all night from a steeple close to the Inn.
>
> "We were extremely disappointed with Liège. It is a dirty old town but it far surpassed our ideas in another way. Nearby are the vast works of Seraing of which the King is half-partner. By the courtesy of the King, his representative, Colonel Bake, personally conducted the party over the whole works."

The usually dauntless Mrs. Herschel wrote that:

> "it required all my strength to stand the sparks of red-hot iron flying about in all directions and the tremendous roar of the bellows and the hammering of iron."

and Herschel wrote to his Mother:

> "Margaret was not a little amazed at the display of power in the 'engine-house' where a 60 horse engine is blowing a great pair of bellows and an 80 horse one is working the machinery of the Iron forges, it is indeed stupendous."

Yet these sights and sounds so familiar to Herschel actually revived him. He wrote enthusiastically about its vastness as an engineering concern, its inexhaustible coal mines, its fine bed of iron-ore with a large navigable river and an unlimited command of capital. Such subjects appealed to his imagination. Greatly impressed, he added that

> "the firm has just completed three 100 h.p. steam engines to work one steamship which is now lying at Rotterdam ready to boil for the Indies if anybody can be found to navigate her."

The principals appear to have been Mr. Cockerill, an English engineer (who had acquired the immense fortune of at least 2½ millions sterling) and the King of the Netherlands, who thus became one of the richest merchants in Europe.

From Liège they had shocking weather. Mrs. Herschel's indignant letter to her Mother tells of that soaking drive:

> "We had a horrid ride of fifty miles in a torrent of rain to Aix - the direct distance from Liège is thirty but a rascal of a postboy put us into the wrong road and made us go twenty miles about. We had the utmost difficulty in getting the last vacant rooms, a garret at the 'Aigle Noir', where there is just room to swing a cat. The place is overflowing on account of a Quadrennial Musical Meeting, for which we have got tickets. It is under the direction of Fried. Ries and on Monday the whole of Haydn's 'Creation' is to be performed, which already sets my ears a-tingling.
>
> (Later) ..... There were upwards of 200 chorus-singers and more than 100 instrumental performers, Herschel himself says he never heard anything to equal it, I found I could scarcely sleep for nights after it and it will be long before it leaves my waking thoughts."

During their absence the Proprietor improved their quarters and Mrs. Herschel wrote:

"The sudden turns of Fate! From the garret we are got down to the first floor ... to a magnificient suite of apartments hung with Tapestry and adorned with Chandeliers of cut glass. By throwing open the bedroom door we make a promenade of 70 feet in length."

The "Aigle Noir" still stands opposite the vast and curious old Town House, the meeting-place of Kings and Emperors in the 1818 Conference. The windows open over a noisy Square always crowded with jostling folk. Herschel criticised this foreign atmosphere in some detail to his mother:

"The worst nuisance is the stench of tobacco which pervades all things High and Low - Rich and Poor - all smoke and take snuff. I suppose we shall soon take to smoking in self-defence. I am now going to try Margaret with a cigar..(Later) She calls me a filthy beast!! ... It is too bad ... I shall go out and get a dozen cigars and smoke night and day. We passed yesterday afternoon in a Café where we were forced to take refuge in an afternoon walk by a sudden and heavy rain - and where, having shut out some of the Tobacco smoke and thrown open some windows, we took our coffee and read the life of Luther which, to provide for such a contingency, I had put in my pocket."

The town of Cologne made but little impression on them. During the few hours they spent there in calling for letters between a change of horses they hurriedly glanced at Rubens's "Crucifixion of St. Peter", caught their first sight of the Rhine, and then climbed back into the carriage, summarily dismissing Cologne as "execrable".

From Cologne to Bonn they trotted steadily in clouds of dust of their own raising and in the hot sun along the road beside the river, winding with the windings of the Rhine round the foot of each jutting headland crowned by castles on crags till they felt choked by the heat and gritty dust. At last the postillion with a final whip-cracking along the street pulled up the carriage at the hotel in Bonn.

From this headquarters Herschel and John Stewart geologized, armed with hammer and bag, whilst Mrs. Herschel followed them devotedly, mounted on donkey-back in an armed-chair, where she found the motion and tremendous jolting very trying when the poor beast struggled up the peaks of the Drachenfels and the Wolkenberg. High up on the Loewenberg they lunched, fanned by cool breezes, and looked down at the silvery reaches of the Rhine in the sweltering valleys below.

Sunday came round again: that calm of a Sabbath spent within doors and followed by a walk later in the cool air. As they walked they read Luther's Life, glancing round them now and then to be discreetly "amused into a laugh by the strange outré manners of the students in the University Gardens". Then, refreshed and cool they went to tea with

Professor von Schlegel[x1] and profited by a long talk with Professor Noggerath the famous German geologist "who", says Herschel, "gave me much useful and curious information about the vulcanoes etc."

The road wound on in prostrating heat up the Rhine valley till, quite exhausted, Herschel stopped the horses at Rheineck and only went on by moonlight next evening to geologize at Andernach and eventually reached Coblentz. Even Mrs.Herschel conceded that, "though she was in the full possession of health and happiness, travelling would never do for a weak person or an invalid."

The scenery in the early hours of the great stride of 50 miles from Coblentz to Mainz is stimulating, it bristles with crags and castles perched aloft and mountain sights too many to record but Herschel commented on a famous echo as they reached the corner:

> "At the rocks called Lurlei (sic) we got a fellow to blow a horn which was answered twice, they say that in a fine evening it answers 6 or 7 times."

After driving miles through forest gorges where the Rhine and the road together thread their way, at Bingen there comes the sudden outlook over a "wide extent of flat champaign territory". At that date this was the entry to the Grand Duchy of Hesse, here the traveller sees far off "on the one side the Mountains of the Vosges in France and on the other those of the Schwartzwald in Germany"[x1]

From Bingen to Maintz the outlook becomes monotonous but fortunately their traveller's box of books provided distraction for the trio cooped up for miles inside their carriage (the maid was cooped up in the rumble). There they sat behind sweating horses listening to the pounding thud of hoofs alternately muffled in the soft dust or ringing out over stone pavé; the box helped to relieve the boredom. An excellent routine existed in those days amongst those who drove in their own carriages, they read some book aloud, Herschel too had caught up the habit and in all his foreign tours he took with him, besides scientific instruments in baskets and cases a box of books some bearing on the passing neighbourhood[x2] and, also others on this journey, including Law's "Serious Call", a Life of Luther, Spencer's "Faery Queen" the latest "Waverley Novel, a work of Wilberforce, and A "Life of Napoleon". And carefully wrapped up in its

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x1 August.W.v.Schlegel. Professor of History at Bonn University 1767-1845.

x1 This is now again the political situation following a 50 year change of rulers after the Franco-Prussian War of 1870

x2 His copy of Eustace's "Travels" is still in his library.

case is his flute as a separate package.

A little Camera Lucida might well travel in his pocket in its oblong wooden box and leave its paraphenalia of board and materials to join the "numbered" parcels. Herschel bound up his pictures in portfolios, full of fine artistic scenes sketched at wayside halts and memories of important buildings carefully drawn in detail with the help of this apparatus. In the present day we use another instrument, the "Photographic Camera", for much the same reason though quite unconcerned that but for Herschel's own discovery in chemistry[x1], we too might be carrying about pencils and prisms and sheets of paper stretched on boards, hoping to copy the scene before us as he did. But, be it noted, success only comes to travellers gifted with considerable artistic powers of hand and eye, and much patience. Herschel's finished productions have almost the appearance of etchings.

The day's journey to Mainz dragged on till 11 p.m., at which hour the four tired travellers had the vexation of waiting outside the town walls of Maintz until the sentinels should unbar the gates. Inside the walls in the cooler night air they found workmen still busy paving the streets by lamplight to avoid the heat of the day ... .At this time some letters miscarried, however Herschel's descriptive letter dated June 24th from Carlsruhe goes back

x1 See back p.

to the day they crossed the Prussian frontier at Bingen and to the striking advantage he discovered in the Grand Duchy of Hesse:

> "There is one grand relief here which is that people do not smoke quite so unceasingly as their neighbours on the Rhine. There it is really dreadful."

The letter omits Mainz and the frontier delays between Hesse and the Grand Duchy of Baden somewhere near Worms, then picks up the story again at Mannheim. Here the plan of the town grips the mind of the mathematician:

> "We were much pleased" he writes "with the regularity of this town, which is in fact so complete that the whole is composed of square masses of houses and the streets are numbered A1, A2, B1, B2, and so on."

He tells of a detour and a night spent at Schwetzingen to explore the Scenic Gardens of the Grand Duke:

> "They are of great extent and beautifully laid out"

says Herschel in a vague way, but Mrs. Herschel delighted in the details, the artistic grouping and long avenues of stately trees. She ransacked her memory for any such gardens in England...

> "It is no affectation to say that Kensington Gardens or any gardens in England would cut a very poor figure when put in comparison with these. The grounds about Stowe Park are like them but you have no idea of the difference of the growth of the

trees .... beautiful acacia growing like a forest tree. Some of the poplars on the roadside measure at least 120 ft. high. The gardens are laid out in the most tasteful manner with fountains, statues, temples, and long avenues of stately trees."

But it is Carlsruhe which eclipses all previous sights in the Duchy. Herschel's own letter closes on a high note of admiration.

"Nothing we have yet seen comes up to the Grand Ducal Palace and Garden at Carlsruhe for the whole town is so built as to have all its main streets pointing to the central tower of the Palace, and in the center (sic) of the Palace is a high Tower which commands a most splendid prospect of the town on one side and a beautiful garden terminating in a vast forest on the other stretching like a sea to a clear offing and backed on one side by the Vosges Mountains and on the other by those of the Schwatzwald."

They climbed to the top of this Tower, the pivot of the town-planning; below them they saw streets radiating like spokes of a wheel from beneath their feet and they saw the gardens and far off mountains as described by Herschel.

Referring to reading out loud, Mrs. Herschel writing from Carlsruhe says:

"We have finished Bonaparte's Life; it was peculiarly interesting at this time as we hear his name mentioned so often. Most of the fine pictures we have seen had been rudely seized upon by him to enrich his collection and, after the year '15, returned to their original owners. The guide at Schwetzingen told me that the mother of the present Grand Duke of Baden was a Princess of France! Stephanie Beauharnais the adopted daughter of Napoleon."

From Carlsruhe is a mere 20 mile drive to Baden-Baden. The travellers fell deeply in love with its woodland beauty and Mrs. Herschel wrote to her sister in England that:

"This place is more like a paradise than anything I ever thought could be on earth. If I could transport you and Mama here, I could almost answer for your bursting out a-crying, when you opened your eyes on such a scene as this, as for myself, I don't know whether to laugh or cry when looking at it."

All three of the family went out at 8 in the morning together thinking to return to the Hotel before breakfast, but the ruins of the Castle and the astounding views from the wooded heights above, (not to speak of the discovered possibilities of "coffee") inveigled them into deserting their prosaic hotel and its dull meals. Mrs' Herschel recounts that at the old Castle:

"Herschel and Johnnie were busy taking views but in the middle of the day we were caught in a furious storm of rain; Herschel, who was at some distance sketching the trees got a complete drenching before he could come to shelter. But the clearing of the storm was worth all the wetting, for some of the clouds lingered between the hill below us and then the beaming of the Rhine after all was over, was most exquisite."

How infinitely preferable to the massive routine of table d'hôte. Here is her description next day:

"The great dinner bell is rung at one o'clock and the company drop in by degrees, those who have been longest in the Hotel taking the highest places and the rest in order. Each party converses by themselves. There is no "Mine Host" but the waiters take the dishes and carve them on a sideboard. The whole affair is very quickly got over here for we were only an hour and a quarter at table to-day. ... The heat has returned again and Herschel is busy making observations on the rays of the sun."

His system of keeping their room cool is scientifically sound.[x1]

"Herschel has decidedly the right side of the question for it is most refreshing to come in from an atmosphere where the thermometer is 83° F. out of doors, to our room where the outside shutters, windows and doors are kept closely shut, the difference is 15° lower (68° F.) otherwise it would be insupportable ... Herschel is perfectly well, he is in excellent spirits, but at times overcome with the heat. He is excessively kind to Johnny, and is now teaching him chemistry."

Herschel briefly described those halcyon days in a note to his Mother:

"We go about sketching, reading, hammering the hills, flute-playing, etc."

At Baden, Fate overtook them. Their plan to visit Italy and travel all the summer ended abruptly. Miss Baldwin sent an alarming letter from Slough with news of the severe illness of Lady Herschel.

It is distressing to think that but for being detained by the loss of an umbrella they would have

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x1 See back p.112.

driven off in blissful ignorance towards Schaffhausen. Mrs. Herschel's letter explains the calamity. The facts were that the carriage stood at the door, Mrs. Herschel ~~had run~~ ran out with her young brother to buy another umbrella whilst her husband paid the bill, but in this brief delay the Hotel post-bag arrived. When she hurried back from the shop Herschel received her in silence and put Miss Baldwin's letter into her hand. It amounted to a summons to return home and Mrs. Herschel wrote: "In a moment our route was decided." Her grounding in the tradition of wifely unselfishness guaranteed to Herschel her point of view. She immediately begged Herschel to countermand the orders to Schaffhausen, the horses heads were turned round and the carriage rushed them westwards for Strassburg.

Miss Baldwin's letter was quite unnecessary, the attack of gout - as usual - yielded to treatment* and Herschel evidently misunderstood her panic at being alone in charge of Lady Herschel. A more discerning person than the rather excitable Miss Baldwin might have restrained herself longer and this letter never would have been written and yet perhaps Miss Baldwin recalled to her alarmed mind, John's absence abroad when his father lay dying?

Herschel's life-long training in a son's duty and his real affection for his mother ~~bore down~~ overrode every thought in

* See Letter to C.L.H. from J.F.W.H. May 1817 - "My mother has had one or two attacks of giddiness in the head of late which have been relieved immediately by cupping and which she is told are no way dangerous if treated in that manner as soon as they occur."

his mind, even his new duties towards his young wife. She was not yet 19 and this volte face, this conclusion to the journey was a sore trial; indeed it was her life's disappointment. In her old age she grieved that she never again had the chance to see Italy.

At Strassburg next day Herschel wrote to his Mother. One recognizes well-trained filial piety in the sentiments and he must be forgiven this unintentional neglect of his wife's feelings. On her part with her guileless training in the theme "To yield with such a happy art, that no-one thinks you care ..." Mrs. Herschel probably never gave him the least hint of her disappointment and yet why did he never again plan for her a little ramble with him in Italy?

In the letter to Lady Herschel, written in conventional phrases, he says:-

> "..... It would be impossible for either dear Margaret or myself to enjoy the least satisfaction from any objects we might see to compensate for the pain of knowing or imagining you ill and we not near you ...."

He posted the letter from Strassburg on July 6th.

By July 11th. their stampede over France through Chateau Salines, Verdun, Stenay and across country to St. Omer reached a pause at Calais. They parted company.

Herschel alone and in burning haste tore on across the Channel. On the 13th. he was galloping down the Great West Road, though perhaps only by that moment could Lady Herschel have received and read his second letter (posted somewhere 'en route'). It told her to expect them on the 17th, Friday, at 3 o'clock, the luggage to precede them on the Windsor Coach "so pray let William be on the look-out and stop all coaches after this arrives.....I do not say we are very fresh for sleeping and dozing on board is always fatiguing".

Herschel achieved his own rush-arrival on the 14th. others arrived according to plan on Friday 17th. July.

Herschel summed up this scamper for home in a letter to his Aunt Caroline:

> "Nov. 7th. 1829.....Margaret and myself were recalled rather hastily from our travels by the news of my Mother's illness. We were on Monday at Baden Baden and that day week I was at Slough having dropped Mrs. Herschel at Calais, who bore the rapid and very fatiguing journey through France by way of Strassburg wonderfully well."

It is a typical "John Herschel" arrival. With uncurbed impetuosity he raced home to his mother exactly as he might have done before his marriage. Also typical of how from time to time he failed to gauge the feelings of others. We may of course suppose that Mrs. Herschel, escorted by a maid and her own brother could come to no bodily harm. She would arrive safely in Slough a few days after her husband, and as far as Herschel could imagine it would suffice her. Why not? And yet about this tour she suffered a life long disappointment.

As it happens it proved a quite unnecessary race across France, Lady Herschel's dangerous symptoms having ceased too late to stop their change of plans.

However Herschel made no difficulties over changing plans. He snatched at the opportunity to settle in more comfortably at Slough with his wife, his mother being on the point of moving to Kensington. The young couple decided to make structural alterations. His diary reveals the daily difficulties arising in hurried sentences such as - Draft plans,-Engage local builder,-Furniture to be divided- "Inventories"...."At home rummaging," Eventually on Michalmas Day Lady Herschel leaves Slough for a temporary stay in Kensington till she could move into her hired house in Windsor on Lady Day next.

At the same time Herschel is constantly on the road. To Windsor in his capacity of land owner involved in legal proceedings with an outgoing tenant. To London by coach on Trustee business. Also in his own phaeton he drove his wife over to Wanstead, presumably to see Matilda Grahame at School, and thence deposited her with Mrs. Stewart.

Here he left the horse "Zephyr" & carriage and he himself urgently returned to Slough by the night mail coach "8.20 to 10.5 p.m." intent on getting a good sweep of the heavens. No luck. His diary notes of the drive are: "Splendid night at starting. Thick, cloudy at Slough, so no sweeping as expected."

However, eleven nights later, having driven his wife back to Slough he states: "Splendid night. Full moon. Swept till midnight. N.B. only double stars can be done in moonlight and then very well".

This note is an incident in that series of observations of the nebulae already mentioned to F. Baily in 1827. Nothing is to stand in the way of these observations unless it be the weather. They continued & were communicated to RAS till 1870. Jan.

For example early in 1830 Professor Barlow proposed to compare with Herschel the excellence of their respective telescope by mutual observations of certain stars. This appears a somewhat frivolous reason for disarranging a sequence of serious observations. Herschel's in reply conveys that impression.

"Mar. 31st. 1830...You are perhaps not aware of the circumstances which render it impossible without a great sacrific to do more than what I say. I am engaged in a regular course of observation in which the telescope is not without extreme reluctance of my part moved out of the meridional situation and the observations of each night are confined to a zone of 3° in breadth of the heavens as it passes the meridian. Nor can I chuse (sic) my zones at pleasure. The objects which I am observing (the nebulae) are singularly distributed in groups in certain portions of the sky & I set my sweeps accordingly".

Herschel, delighted with the achievements of his instrument, proclaimed the day previously to Capt. Kater:

(30th. Mar. 1830) "I now see with astonishment what a treasure I have had by me for these two years without appreciating it, I knew it was good but not how good. A week more such weather would exhaust me".

P.T.O

the origin of this telescope, "19th. Mar. 1830...I have established at Slough, Mr. South's 7 feet equatorial which I purchased of him in 1828. I mean to make it a regular part of my Astronomical Work to observe constantly the Binary Stars*1 (so I would call those which really are united in systems, using the general term Double for all those apparently so). It is very necessary to keep up a constant practice of this. The observer must know his star. A year or two of interruption unfits the eye for such observations, as I have fully experienced and he must begin his lesson again".

Every night when stars and weather combined in his favour he swept the skies. On one night the diary says: "Swept with John Stone",*2 only every night we can take this assistance for granted.

In his new role as master of his own house, Herschel engages a footman.
The Diary Notes: "Up to London to see about servants. Hired J. Sheldon at 20 guineas plus one guinea a year with character from Rev. Mr. Railton. Eagle House School, Brook Green Hammersmith. Drove "Zephyr" to Kew Bridge 2¼ hours & thence coach".

The young couple apparently carried out their social duties very thoroughly, Zephyr trotted them round the neighbourhood in the phaeton and earned his oats till Herschel mentions: "Mrs. Stewart and Patrick arrived bringing down my carriage from Hall the coachmaker". After this he "hired horses to the carriage & called on the Boltley's & the Miss Tunno's". (at Taplow). Naturally dinner invitations resulted...."Dined Richarde's, met Somervilles. O'Reilly there, is a foul-mouthed fellow. His remarks on Mrs. Prettyman & Slingsby". Now Slingsby was the Curate in charge at Upton Church and most probably on that account, next day Herschel states that the owner of Upton Court "J.H. Nelson called, seems inclined to take up the cudgels against O'Reilly".

For a good cross sections of Herschel's life at Slough the following are Diary Notes in 1829. The last October note is: Saw a Solar Halo at 4.23 walking from Kentish Town to Hampstead.

"Nov. 2nd. Shirley called with a Petition.- Paid Lovegrove my

*1 These true double stars were first discovered by Sir William Herschel and it would appear that it was his son who in 1830 first termed them "Binary".

*2 John Stone was the workman who went with Herschel to S. Africa in 1834 and proved such a valuable mechanic. He returned with Sir John to Slough and probably on his retirement kept the Inn on Chalvey Green: "The Cape of Good Hope" His tombstone is in the churchyard of St. Mary's Slough (about 1863).

* Their faithful lady's maid on the Rhine journey. For text see next page.

my Mother's assessed Taxes £5-12-0.

Nov. 7th. Paid Sharman's Bill at Windsor £5 5s-7d., who demurred about discounting it. Did.- Bespoke a Bride-cake for Tucker. ✠

Nov. 10th. Brown's men finished laying out the garden.

Nov. 12th. Dined at Tunno's. Met Wilkie & Newton. Margt too unwell to go.

Nov. 16th. Drove out in carriage with Margaret to Maidenhead.

Nov. 25th. Set a brazier in dining-room to dry it.

Nov. 27th. Dr. Ferguson came.-

Dec. 2nd. Kensington, took Margaret up in carriage. She remained away till 11th. January, whilst building operations were in progress.

Dec. 7th Lord Adare (Etonian) called on leaving. Is going to be under tuition of Hamilton (Dublin)

Dec. 5th. Left Margaret with my mother at Kensington & returned per coach leaving carriage at Kensington.

Sunday 6th. Church, afternoon, Mr. Gore.

Dec. 7th. Rode over to Westend to see Mr. Wilmer's house now to let, for Fitton. Wrote Fitton — Hollis began drawingroom.

Herschel seemed to be spending his life immersed in these small though stirring activities yet in the back ground his article on "Sound" reached completion. It went off to the printers early in December and appeared on Feb. 3rd. 1830 being the article on 'Sound'✠ in Vol IV of the Encyclopedia Metropolitana. It is essentially readable & explanatory. It abounds in graphic examples and lights up the elementary possibilities in scientific subjects. It winds up with a report of the "Singing Sands" near Mt. Sinai, so-called from "the musical sounds of a very singular & surprising character heard there". One of the few Europeans who have explored those regions mentioned it in 1812. Herschel concludes the whole article with the following challenge to the present generation: "We shall be glad if the visits of travellers to the spot shall throw further light on this very strange phenomenon". ✠ Op: Cit. Shortly afterwards diary-entries show him resting by taking a change of occupation. He writes: Got the rough-cast 20 ft. swung by a tackle on the large pear tree by corner of observatory in Back Yard convenient for grinding. Got an old tea-urn adapted to drop water on the stone. N.B. Can't use a better thing.- He potters about doing a little incidental gardening:' "Planted bulbs, set back espaliers" etc. and next reports himself in full swing grinding at the telescope reflector for a ½ hour. Then after a pause for a whole hour. However there are limits to human endurance as a later entry points out: "Set Wake & Morris to work regularly at the 20 ft.

✠ Op: Cit.

resultory way for ½ hour morning & [illegible]

N.B. The Grindstone is Niedermaning Lava. With coarse emery strewed on it. N.B. Each man has 2/6d. a day. It is hard work".

1830

On March 28th. he swept "from 10 to 15 S.F. superb". On March 29th. "Worked at Equatorial 8-12. Showed Margaret Saturn. Swept 12 to 1. Resumed Equatorial, worked on till 5 a.m. morning twilight. The very finest night I ever witnessed". About 25 hours later comes an important entry: March 31st. Our daughter born this morning at 6.5 a.m.". Next day find him driving up to Doctor's Common, partly in the phaeton, partly by coach from Brentford to Ludgate Hill. He returned from Brentford to Slough his thoughts lulled mile after mile by Zephyr's plodding trot. It seems to have soothed him and inspired him with a new zest for writing. his diary note that day says: "On road considered of a work on Logic or rather the Principles of Reasoning. A fine subject". Apl: 1st 1830.

We may suppose the sudden thought dazzled his mental outlook just (as he had once remarked) like Sirius swimming into view on the 20 ft. reflector. We can feel surging waves of thought battling to express themselves in orderly fashion, he betrays such feelings in an ardent & intensely characteristic letter to his wife, as follows:-

I have found a flaming passage in Cicero* which will suit me to a T. for a motto to my Discourse on Science that is to be.

* [Trans: "Before all other things man is distinguished by his pursuit & investigation of truth etc."]

It has rather electrified me, so that I am all in a ferment, going about the garden, looking how the trees grow and threatening what fiery things I shall one day write. Two stars last night and sate up till two waiting for them. Ditto night before....Sick of stargazing mean to break the telescope and melt the mirrors."!!! July 23rd. 1830.

This book under the title "A Preliminary Discourse on the Study of Natural Philosophy" appeared as the 4th. volume of Lardner's Cabinet Cyclopedia & presents a vivid review of the physical sciences. It is calculated to provoke curiosity in the mind of any enquiring reader at that date. The instinct of the publisher, the Reverend Dionysius Lardner, for the need to supply information by men in scientific renown in an attractive manner inspired the mental energies of many a young man by his publication of such volumes. A letter each from Faraday and Darwin to Herschel thanking him for his stimulating words abundantly prove this book to be the slow-match which

* Extract of 9 lines from Cicero, de officiis. Lib I para: 13.

kindled many a flame of thought in master-minds.

Like most English winters this first winter of married life offered samples of all sorts of unpleasant weather.

Being in London on Dec. 14th. Herschel mentions a good specimen of its well-known fogs: "This morning the fog so thick that objects were invisible at 9 paces. Looking out of Grahame's window (at breakfast) I could see a women's straw bonnet but not the woman. Going up to South's (on Campden Hill) as I mounted the slope began to see the sun & observed distinctly a large spot (on the left circumference). The fog covered the lower part of his garden & trees. The tops of the shrubs looked out. Saw his great object glass 11½ inch. aperture; forces 19 ft. Drove Zephyr home. Fog intense. After Brentford watched the spot in sun which was very striking & remarkable."

About a month later the really cold part of the winter came on, but before that we may read how he "accompanied Margaret in carriage to call on Somervilles, Inglis' etc. Drove over a child. No hurt"!!- apparently all in the day's work! Dec 28 1829.

On January 18th. (1830) "A most severe day. Saw sun set in an interval of ¾ hour. clear sky the first time for weeks.

January 19th. Began to snow & blew hard.

January 20th. Last night great fall of snow which buried some part of the telescope foundation & radial beams.

January 31st. The frost again with howling north wind.

Feb. 1st. Frost continues. Therm^{r} noon 25° F.

Feb. 2nd. Cold desperate & increasing 17° F. at 1 p.m.

Feb. 3rd. More snow 21° F. at 9 a.m. Occupied front drawing-room, Concluded, "Sound".

Feb. 6th. Thermometer 16° F. at 9 a.m. cloudy.

Feb. 12th. To Kensington. Posted up with Margaret. The road so broken up by frost & thaw that we were forced to have four horses to Hounslow.

The Derwent SCRAP BOOK

Portrait of J.F.W.H.

taken by - - Jensen - for the Czar of Russia's collection of Portraits of living astronomers for the Observatory at St. Petersburg

In J.F.W.H's Diary -

1843 - Augt 14 to 18 -

14th Mr. Jensen came again

15th Sate for last time to Mr. Jensen - "for my picture"

M.B.H. letter to Mrs. Jones -

1843. Augt "A Danish artist, Mr Jansen, is authorized by the Emp.r of Russia to paint all celebrated astronomers for the new Observatory at St. Petersburg. We are now in great glee at seeing him (J.F.W.H) sitting for his portrait so demure & so obedient that it is quite affecting."

1838 To Lloyd at Mauritius. Reference to his Banquet in London. Page 1.

1838 To Duke Sussex. Declares offer of Baronetcy. Declines

1838 Do. On second thoughts does not want hereditary. Page. 2.
No "eldest son".

1838 Do. As arguing not allowed, must accept.

1838 To Beaufort. Lloyd's Mauritius Obs. only medium. Page 3.

1838 Beaufort. a 15pp. letter being H's "considered statement" on the condition etc. of Cape Obsy.

1838 To Humboldt. re "Coal sacks" i.e. "absence of stars."

1838 To Robertson. H's opinion on "Survey of India."

1838 Whewell. Again the question of PR. S. for H. NO.

1838 Cooper M.P. No telescope now in use.

1838. W.H. Smyth. Can't sit for portrait, Pickersgill sickened him of it. MENTAL PROCESS Vol.V 2.5.12.13.

1838 W.H. Smyth. H's two brothers-in-law as publishers.

1838 Whewell. Capt. Ross & Southern Expedn. Vehement support.

1838 Whewell. Early fountain-pen.

1838 Lord Minto. Need for Physical Obsy. besides astron. obsy.

1838 Sir George Napier Gossip about old Cape memories, Page 5.
Stokrenstrom.
Round C.L.H. "time has stood still." Bad weather in Eng.

1838 Sir G. Napier. Eductd. at Cape. Waited on Lord Glenelg. Waited on Sir Geo. Gray and urged a College at Grahamstown for better classes.

1838 To Lloyd. Drudgery of correspondence. No Amanuensis. Page 6.
MENTAL PROCESS Page 3.

1838 Ld. Northampton P.R.S. Urging action on Mag: operations.

1839 Schumacher. Tediousness of writing. MENTAL PROCESS Page 3.

H's speculation on cosmic cloudiness MENTAL PROCESS P. 3. 6.
H's health.

1839 Whewell. Pride in his Arnott Stove.

1839 To Fox Talbot Photography.

Jan, 30. Forecasts photog. of moon etc.
(Letter from CLH. about returning to him 71 tel:) Page 7.

1839 To Fox Talbot. re Daguerre also Hypo fixing.

Feb. 9

eb 12. To Fox Talbot. Says he has discd. Fox T's method of fixing. Page 7.

1839 Buckland. Refusing Savilian.
1839 Whewell. Ross's Exped. Get a move on.
1839 J.D. Forbes. Eternal letter writing. No time for Reductions. MENTAL PROCESS
1839 Philips. Invents a syphon barometer.
1839 Sykes. Refusing (? Savilian) No more Astrony. when Cape Obn. have been published. Bad health MENTAL PROCESS Won't be "sleeping partner". p. 3. 6.

1839 Lloyd. To Paris. (Did he?) Page 8.
ap. 22. Fox Talbot. Photography. MENTAL PROCESS
ap. 27 Do. H doing two things at once. Going to Paris and photog. P. 6.
1839 To Ld. J.Russell. Not accept Fellow London Univer. with further information of duties.
1839 To Arago. I have borrowed nothing from Mr. Fox Talbot.
1839 To Stockenstrom. H as go-between St. and Napier.
1839
July 5.6. Fox T. re spectrum and photogy. results.
1839 Cersted. re coloured photograph of spectrum.
1839
Aug. Lubbock. Overworking scientifically whilst also negotiating about purchase of Collingwood. MENTAL PROCESS also see p.9. Whewell. 3. 6. 7.
1839 Whewell. H trying to draw up 2 reports Metl. (R.S.) Page. 9. and Ross Exp. (Brit. Ass.) Purchase of Collingwood.
1839 To ?? re Ultra red rays, do not darken. Au contraire. "this opens up a vast field".
1839 Tredgold. Stockenstrom Banquet. MENTAL PROCESS 3. 6. 7. 8.

1839
Sep.10 Fox-Talbot. Glass negatives.
1839
Oct. 9 To Airy. Coloured pictures.
1839 To M. Hall F.R.S. is honoured by its Fellows not vice versa.
1839 R. Hunt re On 157?
1839 Sabine PR.S. cannot be a man of sc. & of rank but Ld. Northampton has done well.
Competition in science violent. Lloyd sacrificed to his own subj. Herschel felt he sacrificed to a subj. on which not keen. MENTAL PROCESS 3. 6. 7. 8.

1839
Dec. 16 Sabine. H has dropped R.S. Page 10.

1840
Feb. 5. Ld. John Russell. In defence of Stockenstrom. Page 11. see mis dating

1840
Feb. 5 Hodgkin Stockenstrom. On Frontier politics. MENTAL PROCESS P. 7. 8. 10

1840 Whewell re Hist. Induction Sc.
1840 Baily JFWH as PRAS & expulsion of members.
1840 Forbes Photography.
1840 Fox-Talbot Almost identical.
1840
Mar. Sir J. Lubbock Rebuke as PRAS to Lubbock for peppery letter. MENTAL PROCESS 7. 8. 10

1840 Whewell. New Kentish Home. Coaches serving it.
1840 ? Sec. Sub. Comter. R.S. R.S. shd. be theoretical not practical & therefore their Com. at Somerset House on Met. Obsy. shd. be taken over by the new Met. Society. R.S. must advance with the times. Any new Met. Soc. must be first class.

1840 To _____? Refusing to join any more Societies.
1840
Jn. 28 Cersted. About old telescope..."Requem."
1840 Lubbock. Proposing Sabine as Head of new Physical
Jn. 30 Lab. MENTAL PROCESS
1840
Jy. 3 Lubbock. (? Treasurer of R.S. ? therefore) A Tilt agst. R.S.
1840
Jy. 8 Sec. of R.S. H's own views on Met. Soc.

1840 Struve Page 10
1840 Struve. Thoroughly disgruntled, no time for anything since return 2 yrs. ago
Studying variations of ? Orionis.
1840 Sir. G. Napier. "Stockenstrom affaire."
1840 Whewell. re Induc. Sciences. MENTAL PROCESS 7. 8. 10. 11.
1840 Prof. Forbes. Physical Obs. 7
1840 Sir H. Bunbury. re Stockenstrom and Napier.
1840 H. Lloyd. Greenwich Obsy. Magnetic building.
1840 Sir G. Napier. "Stockenstrom affaire." H. go-between. MENTAL PROCESS 7. 8. 10. 11.
1840 H. Lloyd. Greenwich Obsy. Phys. Lloyd to summarize need.

1840 Wallace. H's love of cats! Page 11.
1841 P. Micklethwait. Not a J.P. please. Must work scy. in peace.
1841 Sabine. ? Rosse's Antartic results.

41 Beaufort. Arc of Merid. at C.C.H. should be remeasured. (La caille's)
41 Sabini. International Magnetic Obsv. MENTAL PROCESS p. 7, 10, 11.
Dinner to Humboldt. H. will attend.
41 Fox Talbot. re Calotype. Also lenghy philosophic dissertation.
41 Whewell. Reviewing Whewell's Ind: Sc: Disagrees (See p. 10, 11.)
amiciably with him.
Christening of d. Amelia.

41 Sabini. H's considered opinion on Metc. Obsv. started.
by Gt: Brit: Practical utility.
41 De Morgan. The Abstract getting absorbed by the Practical MENTAL PROCESS p. 10, 11, 13.
41 Ested. re Danish order offered. (p. 16, 17.)
41 Whewell. Copyright: engagement to Theodore Marshall.
41 Fox Talbot. 2 letters re F.T.'s Calotype & Daguerre MENTAL PROCESS. MENTAL PROCESS re RR.
41 Sir G. Napier. re Caffer education. Should be copied in toto & p. 15 is MENTAL PROCESS.
41 Struve. re Baily's accident.

841 Lr. Contd. re his Pultava Medal. H's health.
re young Struve. re H's Cap. reductions. All alone.
MENTAL PROCESS p. 7, 14.

841 Schumacher. Influence of full moon on Weather.
841 To Schumacher. Miss Hamilton (of Dublin) poetess.
re Danish Order.
841 Whewell. Educational Expts. on H's sons.
841 Quetelet. Meteorl. Obsv. View of weather bird's eye.
841 To Bidwell. re Daguerre's Patent.
841 Sir G. Grey. (Govs. S. Australia) "Herschel Mountains".
Dialects. Gossip.

842 Danish Order (& below to King of D.) H. curiously ignorant about Guelphic Order. Jan. 7th. 1841.
842 Brisbane. re Civil List & Prof. Forbes. MENTAL PROCESS
842 Whewell. a serio-commic letter (Should be in toto) MENTAL PROCESS p. 7, 14, 15.

King of Denmark
1842 Sabini. re duties of various Depts. of R.S.
Funks long letter writing (? eye-strain) MENTAL PROCESS
1842 To Sec: Physics Comt. R.S. On the 24 hours time.

1842 W.H.Smyth. Astronomers work for posterity. English night skies.
1842 Do. re "Sapphire-blue" Unfortunate selection for typical "blue"! Ha!
1842 Bessel. H. desires to make his acquaintance. Invites to Collingwood.
1842 R. Hunt. re Photography. see also Jy. 8. p. 181.
1842 Steinheil. H. once polished 3 mirrors in one day.
1842 Wheatstone. on Brit. Assn. Personal weakening. MENTAL PROCESS this year death of James Grahame 7.14.18
1842 Bessel July 8. re coaching details.

1842 Bessel July 20. Decoration from King of Prussia
1842 Argelander v. Miss Funno's (& 2 Eton nephews)
1842 To Baily Aug. 27. v. Baily's Beads. re "Another Planet" disturbing Uranus.
1842 Airy do. & Sun's flames.
1842 Gaurs the real father of Meteorc. Obsns.
1842 Muehry Doctor M. to watch over Aunt Caroline's health. MENTAL PROCES 7.14.18.

1842 Argelander Comparison of eyesight with H. Lardner's catastrophe ?
1842 Forbes Physiology of eye.
1842 Dr. Draper re Photography.
1843 Fox-Talbot Photography.
1843 Beaufort Practical requirements for Cape observ. Clockwork for Equat.?
1843 Ellis How far can mathl. truths be carried towards universality ?
1843 Bessel H's Mathematics getting rusty. Details of Cape Obsn. and about proposed change of names in S.Hem:
An excellent précis of W.H's character. MENTAL PROCES 7.14.18.19.
1843 Kelcher H.s' opinion of Lord Rosse
1843 Birt. Meteorol I. Will Birt accept Pres.B.Ass.
1843 Airy Technical about Telescopes & Reports for Brit.Ass.
1843 Merts & Mahler re above. Page 27.
1843 W.H.Smyth Geology.
1843 Spahr. Children's governess out of her mind. Gerlach.

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1843 W.Morrison Photography applied to Astronomy. re the Equatl.to C.G.H.
1843 Whewell re Marie Edgeworth re Brit.Ass. at Cam. re choice of School for Willy
1843 Spahr re Governess & re Mrs Mason. sup 20.

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1843 Hodgson Talk of English Hexameters.
1844 Muhry re C.L.H's money.
1844 de Morgan Hawkhurst in 1844, Special Jury. 3 letters.
1844 Mrs Somerville stimulating.
1844 Argelander correcting Charts. H. wants to regroup Stars.
1844 Longmans. Another editor of "Outlines".
1844 Murchison. Indefinite about Chairing Brit.Ass.
1844 Murchison .Accepts Chair. MENTAL PROCESS 7.14.20

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1844 W.H.Smyth "My book goes slowly" MENTAL PROCESS 7.14.20.22
1844 Whewell Dawes at Cranbrook.
1844 Humboldt who writes in French MENTAL PROCESS
1844 Headlam H.had suggested in 1838 re Furnes through water for bye-products.
1844 Strewe. H. fatigue
1844 Sabine Prefers to form his own independent opinion. Writes to withdraw from Meteorc. Chair of Brit.Ass.Comtee.
1844 de Morgan Mrs Somerville to Rome with a box of books.

Page 24

1844 Sep.do. re Death of Baily.
1844 To B.Baily Legacy of Tavistock Place.
1844 Holland re Memorial of someone at Manchester.
1844 de Morgan re Eloge of F.Baily, for R.A.S.
do Burden of the Cape Observations.
1845 H.Spencer re Origin of the Sunspots.
1845 Gordon Culture of grain by electric. TRY.
1845 Lindley Letters on Meteorology.
1845 Testimonial for C.Piazzi Smyth Reg.Prof.Astron. Edinburgh.

1845 Whewell . re "Plurality"
1845 Draper. self-defence about H. knowledge of phot. in 1839. (and a few more remarks) MENTAL PROCESS p. 7, 14, 20,22.

Page 25.

1845 A. Sedgewick. Laplace allowed W. H. originated Neb. Hypoth.
1845 do. . re "Vestiges" Review it severely.
Comte & Mill. Asks advice on Chairing Brit: Ass: MENTAL PROCESS
1845 de Morgan. One society gulped down by another. MENTAL PROCESS
1845 To ?A Lady. Bad health.
1845 H. Lloyd. Meteorology.
1845 Faraday. Light & Magnetism.
1845 Duke of Northumberland. Insisting on Solo methods for Cape obs.

Page 26.

1845 J.S.Mile. Nebular hyps. & Comte. arguments.
1845 Rev. Jeffreys. Won't sign a Round Robin on principal. MENTAL PROCESS p. 7, 14, 20, 24.
1845 Whewell. Double Stars. Explains his brainstrained condition. MENTAL PROCESS.
1845 Lord Northampton. Stir up Govt. Mag: Obs:
1845 A von Humboldt. Long letter on "Kosmos". Periods of sat: Satell.
1845 Mrs. Somerville. Theorising on vegetable tints. Collingwood "out of it".

Page 27.

1845 Hertz. re Equatorial. p. 20, also next sheet.
1845 Pepys. Asks date of H's R.J. expts. in Magnetism because feels he touched on something which Faraday proved later.
(Pepys reply:* 1823.) Herschel's Diary in 1865? sketches.
1845 de Morgan. H's ill health. MENTAL PROCESS Nov.24. p. 7, 14, 24,26.
1845 Dec.10. Sedgwick. do.
1845? Lord Northampton. re New Chapter for R.S. H's considered opinion.
1845 Mill. Ill health. Criticism of Mill's Logic. MENTAL PROCESS
1845 Hertz.Telescope for C.G.H.
1846 Faraday. Congrats: re H's own health.
1846 R. Hunt. Molecular force. Secret of crystallised form
1846 W.H.Smyth . Cape obs. coming out. Double comet.

1846 Mill. Mill v Laplace.
2 letters see above.

Page 28.

1846 Whewell. Criticism of Wh:'s Inductive Sc:
1846 MacCullogh. H feels rusty in Maths.
1846 Sabini. re Programme for Brit: Ass:
Lord Mayor's Dinner.
1846 de Morgan. Photogy. & Hypo.
1846 Waterston.(F.P.R.A.S) re his enquiry for explanation of heat, magnetism, etc.
1846 Murchison. H's views on Faraday. IMPORTANT MENTAL PROCESS p. 7. 14, 26, 27.
1846 Whewell. re Smoke drifts at Collingwood.
1846 Larsell. 7th. Sat: Saturn

Page 29.

1846 Howard. On principle (What principle?) gives up taking in all Sc: Papers. MENTAL PROCESS
1846 Roberts. Practical details of construction of re-flectors & telescopes.
1846 Whewell. re Discovery of Neptune. Also H's "The Walk".
2 letters p.p. 32 & 33. see also p.15 Vol VII.
1846 Lord Northampton. H, will act proxy for Leverier to receive Copley Medal.

Page 30.

1846 de Morgan. Death of Bessel.
1846 W.H.Smyth.(P.R.A.S.) Adams or the Gold Medal of R.A.S.
1846 de Morgan. Naming of Neptune.
1846 Struve. H says he almost found Neptune in 1830.

Page 31.

1846 Struve.Contd. There must be more planets to discover. Gossip about satellites.
1846 Whewell. re Challis's superness about Neptune, & Airy ditto.

Continuing.
A long chat about the discovery of Page 32.
Neptune. H. emphatic because Whewell's
weight of opinion (see early part of letter)
so great. Solar spots should be regularly
photographed.
1846 R.Jones. (about) Mechanic's Magazine, scurillous article agst. Airy etc. (see P.35) Comment by J.F.W.H. on the Discovery of Neptune. MENTAL PROCESS. 7. 14. 29.
J. contd. Long comment on Mech. Mag. MENTAL PROCESS 33

Contd.Page 33

1847 de Morgan Sec. R.A.S. Not anxious to back Ross's Arctic Expedition.
1847 de Morgan H.s (about to be P.R.A.S.) Abituary of Bessel. Asks de Morgan to read it at meeting. MENTAL PROCESS

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1847 Smyth re Medals for Levenier & Adams.R.A.S. Fitton approached H.
1847 de Morgan reitterating his opinion.
1847 Fitton reply to F's opening the subje.of R.A.S.Medals and Copley to A.& Lev. MENTAL PROCESS

Page 35

1847 H. considers Medals to both enhances the position of Astronomy as a science.

Page 36

Tells F. he has rectd. e copies of Mech. Mag. from 3 people objecting to it.
1847 Sabine Meteor Actinometers all worthless. Proposes to scrap all his own work down with them. (DID HE ?)
1847 J.D. Forbes More about Actinometers(Copy whole?) Page 37
1847, mar.2, W.H.Smyth re Maclear's pension.
184 Marg. do. Levenier question again. H. avoided the Chair.(being now P.R.A.S.) MENTAL PROCESS p.7,14,29
1847 Muirhead J.F.W.H's recollections of J.Watt.

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1847 Weld Details of Great Telescope & W.H. and King Geo.
Constructed on principle now called Corrugated Iron
1847 W.H.Smyth re 2 R.A.S. Gold Medals again. On naming new Planet.
1847 Muirhead F.R.S.E. On Cavendish and Phlogiston (Copy in toto)

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1847 Stratford Name of new Planet still doubtful. H. likes "Neptune" see p.29. repeats (p.33) Orago on "Neptune".
1847 J.D.Forbes H. says Forbes has made a firstrate discovery in the Int:Calculus.(See M.F.H's notes on Life of J.D.Forbes)

contd.page 39

1847 Messrs J.Baillie H's religious views MENTAL PROCESS 7,14,20,29
see p.41

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1847 Bp of Cape Col. Internal affairs of C.G.H.
1847 Peacock Brit.Ass. appears to demand an Autobiography Mental Process
1847 Sedgwick re Queen Vic. at Cam: & H's "book" to be presented to H.M. (Did he?) MENT.PROCESS
1847 Huid . Huid's discovery of Iris.
1847 Lassell re Frauenhofer's prism. H. still has this prism.

Page 41

1847 Cooper M.P. Potatoe disease.
1847 Birt Plea for International Metc.Office (clearing house)
1847 Sabine H.'s religous objection re"Force" used for"power" and v.v.
1847 Bunbury Educ. system at C.G.H.
1847 W.H.Smyth H. as P.R.A.S. on discontinuing Medals.
1847 Lubbock . H. only a figure -head as P.R.A.S. (see M.F.H.'s notes on de Morgan's life)
1847 Sedgwick Collingwood at Xmas.
1847 Whewell re Naut. Alm:

Page 42

1847 Whewell Suicide of Collingwood butler.
1848 Smyth re C.L.H. MENTAL PROCESS 7,14,39,40
Jan.
1848 Jan.19. Sheepshanks death of C.L.H. Obituary to de Morgan.
1848 Sabine Once again declines P.R.S. on resignation of Northampton. See p. 43
1848 de Morgan Facts about C.L.H's life and O.S. Calendar.
1848 do. Royal Family's respect at her Funeral.
1848 do. do. Duke of Cambridge.

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1848 de Morgan re Lubbock's Planetary Theory.
1848 Fox Talbot. Foresees his cersation of optics.
1848 de Morgan Foundation of Ast.Soc.
1848 Dr. Somerville reference to state of Europe.
see below.
1848 Dr. Northampton. P.R.S. question again.
see p.42

contd. Page 43

1848 Somerville Politics, Revolutions on Continent.
1848 Sedgwick Jesting on the nebulous theory H's Health. has influenza.

Page 44

1848 Liddell with H.be President of Mech.Inst. Slough. WAS HE ?
1848 de Morgan a paper for the R.S. by Mr Forbes
1848 do. H's pride in Willie's Mathematics.
1848 do. MENTAL PROCESS p.7,14,39,40,42
1848 Beechey re a Submarine sympesometer
June 10
" 18 seems to have excited H's imagination
" 20
1848 Venn On language, characters and pronunciation
1848 Miss Quicey re Biography of J.Grahame and conditions in France 1848
1848 Strewe H's new Edition Outlines of Astronomy. Moon. Great Comet. List of Russian Observatories. See Vol VII p.3.
1848 Lassell Discovery of Hyperion by Lassell and Bond.(U.S.A.)
5 letters. One letter should be copied in toto on principles of "discoverer". Why did Thues' delay?
1848 re Newton & Moon's Orbit. (Is this a joke)
1848 Adams re do.
1848 W.H. Smyth. re Lassell and Hyperion. Moon's Orbit.
1848 Argelander. mentioning H's resignation of P.R.A.S. and Airy to succeed.

1849 de Morgan. re Baily's bust. Confesses to no taste. re discovery of Hyperion. Page 45. MENTAL PROCESS p.7,39,40,42,44.
1849 Lord Northampton. H. will be at Levée.
1849 Le Verrier. H confesses to being a very slow calculator.
1849 de Morgam. (M.B.H's riddle!) MENTAL PROCESS
1849 W.H.Smyth. Jesting about comforts of new telescopes.
1849 R. Jones. H meets Louis Philippe. Politics.
1849 E.J. Lowe. re an Obsy. Lowe intends to make in the midlands.

1850 J.A. Gordon. (Written from Pan) Won't stand for Parlt. but would accept £200 for his cousin Th. Baldwin. Page 46. MENTAL PROCESSES 7,14,42,44,45.

Page 47.

1850 de Morgan. re Gregorian Calender.
1850 Lord Jeffrey. H by now has become Universal Referee!
1850 de Morgan. re his ill-health & turns to Neb: Cat: as "Worsted work". and Op. 230 on Pyramids.
1850 Whewell. about the Universities?
1850 T.R.Robinson. The future study of Neb: MENTAL PROCESS
1850 von Humboldt. re Milky Way.
1850 Whewell. H's dark study. Trip to Auvergne with daughters. On university Commission for a year perhaps.
1850 Mrs. White. re Garden at Shaw? Nat: phenomenon.
1850 J.D.Forbes. Geology. (The organs of Espially)

MEM to Mrs Stewart

19th June 1839
-- Sep. 1839 (2)
9th Oct. 1839
21st & 22nd Oct. 1839 (2)
25th Oct. 1839
27th Oct. 1839
- - 1839 (no ending)
4th Feb. 1840
5th Feb. 1840
2nd Apl. 1840
4th Apl. 1840
5th Apl. 1840
7th Apl. 1840
12th Apl. 1840 (2)
17th Apl. 1840 (2)
24th Apl. 1840
27th Apl. 1840 (2)
7th May, 1840
- May, 1840
- May, 1840
28th May, 1840
- June 1840
- Aug. 1840
- Sep. 1840
- Feb. 1841
15th & 17th Feb. 1841 (2)
22nd Feb. 1841
- - 1841

-- Feb. 1841 }
24th Feb. 1841 } 4 letters
- - - } folded
- - - } together.

Letters re Geneva;
1 Earlier than March 1842
2 April 1842 (2 sheets)
3 Before May 1842.

Contents:-
52 LETTERS

1st Mar. 1841
3rd Mar. 1841
- Mar. 1841
5 or 6th Mar.1841-2
- Mar. 1841
- Apl. 1841 (no beginning)
May or June 1841
3rd June 1841
- June 1841
- June 1841 (2)
- June 1841
13th or 14th July? 1841 (2)
14th or 16th or 26th Dec. 1841? (2 & slip enclo.d)
5th Jan. 1842
2nd Apl. 1842 (2nd Sheet, enclosing 1st sheet and 3 other letters about going to Geneva - see above)

Oct.9 1846

To Mr. Stratford.

My dear Sir,

For Heaven's sake don't let the Catalogue make you uneasy. I will explain all (if you will leave it to me) and the publication must stand over. I only grieve you are so over worked,

We must however pay the Printers up as far as the work done goes - for the Govt money burns in our pockets and Stock has been sold to meet it.

* * * *

Any how however let us discharge the debt incurred up to the present time before the Meeting.

Pray dismiss all consideration of the subject (other than to collect the acct) from your mind. The world can very well wait yet a while for Lacaille and Lalande.

* * * *

Yours very truly,

J. F. W. Herschel.

Oct 9 1846

To Mr. Stratford.

My dear Sir,

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Pray dismiss all consideration of the subject (other than to collect the acct) from your mind. The world can very well wait yet a while for Lacaille and Lalande.

* * * *

Yours very truly,

J. F. W. Herschel.

However, Whoever saw it on the 16th or 17th May, after all, must have had no contemptible telescope and sky and eye sight. To Lloyd.

1838. June 11. "As to the public manifestation of good will which my friends and the body of Savans have destined for that day, as a mark of honour to Science generally, I shall gladly play my part in it, but as concerns myself I could gladly have dispensed with any such distinction as in truth it seems much more than the occasion calls for - But let that pass. .... It is a fact that Meteorology & Obsns. absorb such an immensity of time & labour & calculation...."

Reference to the Banquet.

38.6. June

TO THE DUKE OF SUSSEX.

On receipt of offer of Baronetcy declined.

May it please your Royal Highness.

The offer of a Baronetcy which your Royal Highness has in so gracious and kind a manner communicated to me this evening calls for acknowledgments which I will venture to hope I need not express to your Royal Highness in words. If the sense of having, according to my abilities performed a duty were not of itself a high reward, the assurance that the Government of my Country has attached importance enough to my labours to be so marked, would of itself suffice to fill up the measure of my wishes on the score of honorable distinction.

I trust your Royal Highness will give me credit for the full appreciation of all that is implied in this offer - at the same time that I may hope to find equal credit for the motives which induce me earnestly to wish that I may be permitted to decline it. The retired nature of my habits, not less incompatible with the prominence of worldly distinction, than that of my pursuits is with duties which may be expected to attach to a more conspicuous station - to say nothing of the mediocrity of my fortune which would scarcely enable me to maintain the appearance proper to a higher rank than my present - (but which yet I feel no urgent motive for desiring to increase) - all these motives will I hope sufficiently explain to your R.H. my conduct on this occasion. But I shall never on such accounts conceive myself otherwise than bound to Her Majesty's Government for the offer - nor most grateful for the kindness with which your R.H. has communicated it and the whole honour of your R.H's. conduct on this and every other occasion as regards myself.

There is one misconception which I should most earnestly desire to deprecate - that of retreating from any proposal connected with the respect and duty due to my Sovereign on the August occasion of her Coronation. I will trust to your Royal Highness's knowledge of my inmost feelings on this point to place this to Lord Melbourne in its right light and beg leave to remain. With all respect and gratitude.

Your Royal Highness's
Most obedient and dutiful Servant,
(Signed) J.F.W. Herschel.

38.6.—. TO THE DUKE OF SUSSEX.

Sir,

The interval which your R.H. has been pleased to accord me for reconsidering the subject of your R.H's. communication has not been passed by me without seriously weighing the objections which presented themselves. Every hesitation of a merely personal nature must, I feel be over-ruled by the public grounds adduced by your R.H. - and by your own most gracious and kind manner of stating them, but there is one, depending essentially on the nature of the honor proposed, as a hereditary one which involving not my own, but my childrens future happiness and respectability, appears to me I confess, insuperable. Your R.H. is possibly aware that among six children I have 3 sons - and without taking any exaggerated view of the influence of such causes I cannot but believe it very hazardous to place the latter on any footing of inequability in point of expectations, especially when the fortune of the family is personal, not territorial, and if divided would leave its representative in a state of comparative indigence - and if concentered on one would place the rest in a position anything but favourable to domestic union or to worldly progress.

If your R.H. therefore should remain of opinion that it is desirable on public grounds that some accession of rank should be conferred on me - I would leave it to your R.H. to decide whether some other honour as nearly equivalent as possible in point of rank but not hereditary might not be conferred with equal regard to the impression to be produced.

38.6.19.

TO THE DUKE OF SUSSEX.

Sir,

When laying before your Royal Highness, as I thought myself bound to do my reasons for wishing to be permitted to decline the Honour intended for me, it never occurred to me to have the presumption to enter into argument with your Royal Highness, nor would it become me now to refer to the reasoning which your Royal Higness has done me the great honour to address to me, for any other purpose than to express myself most grateful for the consideration you have bestowed upon the Subject.

The result of that consideration appears to be so decided an opinion on your Royal Highness's part, that nothing remains for me but to place myself in your hands to dispose of as seems good. And having once come to that conclusion, I must add that nothing can by possibility be more gratifying to my feelings than to find my humble exertions in the cause of Science urged by your Royal Highness and recognized by my Sovereign.

I have the honor to remain,
Your Royal Highness's
Most obedient and dutiful Servant,
(Signed) J.F.W. Herschel.

1838 Call at Jun.

To 7. Beaufort. ... The observatory established by Capt. Lloyd at Mauritius ... I do not consider either the construction of the Building, the description of instruments with which it is provided or the general scale of the establishment such as to fit it for enquiries of this class. [Ans.: to "As they Lords Commrs of Admiralty have done me the honor to enquire through you whether I in my opinion the Obs.y ... can be made conducive to any useful Astron.l purposes."] [In fact he thought it could be used for general astron.l & meteor.l purposes but not for the "nice & more delicate points of Scientific Astronomy"]

1838 June 29. To 7. Beaufort (Pursuing a conversation JFWH had had with ~~the Admiral~~ Lord Minto, Mr Wood, Beaufort & Airy & putting down in writing his views on the Cape Observatory: Understaffed, insufficient instruments, development of magnetism, study of Tides. A long & considered statement, justifiably carrying a great weight with My Lords.]

1838 July 31 To Humboldt. ... Having occasion to call the attention of My Lords of the Brit.h Admiralty to the improvement & extension of the Observatory at the Cape ... ... you. The particulars you sent me relative to your former observation of the Equat.l depression of the Barom.r are such as to leave no doubt on the subject. At the time when I published my Obs.ns of this interesting fact, I had no idea that anything of the kind had been before noticed. Mr Schumacher tells me you wish to know what I have observed about the 'Coal-sacks' in the S. H. According to my observations they are merely places in which a very remarkable absence of stars exists. ... what renders them so striking to the eye ... is the contrast with the very rich parts of the Milky Way. etc. ..

1838 Aug 6th [Letter to J.D. Rolston re East India Co. & a survey of India.]

3.

Capt. Lloyd's Obs.ns at Mauritius only moderate qy

J.F.W.H. considered statement on Cape Obs.y

Humboldt & H. on Barom. measurements

"Coal sacks" are merely absence of stars

re E.I.C. & survey of India

38.9.17.

TO W. WHEWELL.

Should you hear of any intention to propose me as P.R.S. I beg and intreat you to state in the strongest terms consistent with a due sense of the high distinction implied in such an idea, the decided and entire impossibility of my filling that office. It would involve the relinquishment of my most cherished scientific projects and domestic arrangements, long and deliberately resolved on, and which I cannot suffer to be put aside. I trust therefore that (this being duly understood among my friends) no further public mention of my name in the affair will be made, as it would be very painful for me to have the appearance of in any way slighting so great and eminent a body by declining as I must then appear to do, its highest office. I write this because I understand paragraphs have been circulating in the newspapers and an intimation has reached me that something more direct was in contemplation.

Against the question of President P.R.S. arises.

No

38.9.23.

mP. from Slgh. TO E. COOPER FROM SLOUGH.

I have no telescope in use now.

No telescope now at Slough

38.10.17.

TO W.H. SMYTH.

An artist of the name of.....brought me a note from you some time ago with a request that I would sit to him - but I was then going out of Town and could not by possibility give him the sittings he would require.

To say the truth, Pickersgill, (though as a work of art he has really done his part most admirably) gave me quite a sickening of the sort of thing - I thought his sittings never would be at an end and when at length I was really obliged to declare it impracticable to go on sitting and sitting he treated me with an exhibition of temper which really almost made me lose mine. From that day I foreswore as far as might in me lie, becoming a candidate for that sort of immortality. At the same time as your friend was evidently a very gentle-like man, and I have no doubt, from your recommendation, a good artist, I was really sorry to decline a request so apparently flattering to myself and I only hope I did so in a way to shew that I appreciated the compliment duly. And this I hope you will explain to him should the opportunity come

Pickersgill's portrait sittings (Slough) Smyth's portrait (Slough)

1838 Oct 17. To W.H.Smyth. /... Does I not stand engaged to Stewart & Murray as my printers & to Smith Elder & Co as my publishers in whose hands I consider myself as secure of good work & reasonable terms (to say nothing of having a brother-in-law in each of the concerns) ...

1838 Oct 28. To Whewell "The Sanskrit Expedition" "Captain Ross" "defend it tooth & nail" (as I am about it as they were when scheming the Analyst Soc.)

38.10.28. To Whewell.

I write this with a fountain pen made extempore of a bit of glass tube a quill and a bit of sealing wax, and which hardly ever requires replenishing and never dipping.

38.11.5.

TO LORD MINTO.

But when I consider the pregnant nature of Scientific truth, and how upon occasion of every well-grounded acception to or extension of theoretical knowledge a new practise has arisen founded thereon, and old methods have been abandoned as inefficient and uneconomical in comparison, I should feel prepared to advocate or defend a very large and liberal devotion indeed of the public means to setting on foot undertakings and maintaing establishments in which the investigation of Physical laws and data should be the avowed and primary object, and practical application the secondary, incidental, and collateral one.

This however has hitherto been the fortunate lot of Astronomy only. And the result has been, not only the establishment of a complete theory - not only the perfection of Nautical tables and Observation - but an universal impulse given to every other branch of exact enquiry - a higher standard erected everywhere a precision in every determination rendered practicable which would have never before been dreamed of as attainable without the requirements of Astronomy. It is hoping too much that the day may not be far distant when Physical Science in all its exacter branches shall participate in these advantages and when the Establishment of "Physical Observatories" in our own and distant lands shall give that impulse to many other Sciences (as for example Magnetism Meteorology &c.) of which they stand so much in need.

38.11.

TO G. NAPIER. The Governor of C G-H

Whatever the future may be and whatever the past has been, the days of our sojourn in that sunny land will stand marked with many a white stone as the happy part of my earthly pilgrimage.

Capt. Napier was not in Town nor have I been since fortunate enough to fall in with him, having myself (after a residence in Town no longer than was necessary to bring my own affairs into some kind of order, and place our family in comfort pro tempore,) proceeded to Germany, where I had a visit of duty to pay to an ancient relative, a Sister of my Father, whom I found in her 89th year in full possession of all her faculties and in tolerable health. She was the constant assistant of my Father and the companion of all his toils. It seemed as if time had stood still, or rather as if he had forgot her and the stream of events had flowed by, leaving this venerable relic high and dry!

As you read the Newspapers, I need not remark on my own personal reception further than to say it was in every respect most gratifying as an expression of hearty and kindly feeling and far more honorable in one respect than I could have any title to expect. ..... I waited on Lord Glenelg & stated the necessity of some speedy & effectual steps for promoting the cause of Education at the Cape. I cannot say much for the apparent interest excited on this occasion. That horrid Wet-Blanket of a question: Where are the Funds to come from? was almost the only enquiry elicitated. I was therefore agreeably surprised on Saturday last to receive a summons from His Lordship to call on him with reference to this subject previous as his note says to the final instructions of Govt are dispatched. We have had almost a sunless Summer, or rather a prolonged warm Spring - and now that the sweet Southeaster is setting in and all the Cape is glowing with Sun and Flowers, we are undergoing I think the gloomiest November (with exception of two wonderfully brilliant days last week) I ever remember. Everything promises a wet and cheerless winter. O! had we the wings of the dove!

of Govt are despatched. P.S. having called by appointment this morning at the Col: Office where I saw Sir Geo: Grey. I learnt from him that the Govt have resolved to appoint a Supt of Schools at a Salary of £500 with an allowance for travelling expences & 12 Schoolmasters with Salaries from £150 graduating to £300 per annm: ... Nothing is done respecting the Establishment of Lectureships or indeed anything but the Schools, but I took the opportunity to press the Establishment of a College at Graham's Town as fast as fer as the appointment of salaried Professors & other sanctions & encouragements go. ... It seems to me of very material importance that means should exist at G: T. for giving the better conditioned classes a good English-like gentlemanly Education if they choose to avail themselves of it.

Agreeably surprised with C G-H to. Governor Napier

Found C-L-H "Time has stood still"

Education at Cape & Lord Glenelg

Bad weather in England

Sir G. Grey & Cape Schools

Urges on College at Graham's Town for better classes.

1838 Nov 16. H. Lloyd. ... What I wrote ... (having in fact re written it ab initio at least 3 several times) ... The time by the way consumed in copying & recopying letters & papers of this kind, none of the shortest, is enormous & I have no amanuensis.

1838 Dec 23. To Marquis of Northampton P.R.S. [To galvanize him into action over the "magnetic Observations"]

38.12.17.

TO W. WHEWELL.

We are all well, colds excepted. I keep close to my Arnott Stove which is to me the breath of life or at least of exemption from severe pain. All our little folk are well and would be better if they could be oftener petted and pulled about and cross questioned by you.

1839 Jan 19. To Schumacher. ... constant & harassing distractions & business both public & domestic which absorbed so much time & involved so much writing that I have only been too happy to lay down my pen with little or no inclination to resume it. ... Being on the subject of the irruptions of the stars .... changes ... may be accounted for by superadding to Olbers's idea of imperfect transparency in the celestial spaces ... by supposing some sort of cosmical cloud mixed subject to internal movements depending on causes of which we are ignorant ... etc etc. ... I fear

I fear that my health will no longer suffer me to indulge the hope of prosecuting these enquiries myself further in this Hemisphere. To my no small annoyance I find that night exposure at least in the winter season is more than I can now face, having been of late a sufferer from severe Rheumatic affections which warn me pretty forcibly to desist.

39.1.30.

A draft, much altered. TO H. Fox TALBOT.

It has occurred to me that supposing chloride of silver to be the substance employed - the chief difficulty in the case is the preserving the imprint intact by further exposure to light. Now this may perhaps be accomplished thus. Let paper be prepared with chloride introduced into its pores by moistening 1st. with Silver, drying, then moistening again with Mur. Soda, washing and drying in the dark and cold, pressing to give a smooth surface. Now let the picture be formed. This supposes the reduction to the metallic state of all that part which is black. Before exposure to light then, let the whole be sponged with, or immersed in, a solution of hyposulphite of Soda. This will wash away all the chloride which has escaped the action of the light and leave the reduced Silver black as before. Thus there is nothing further left for the light to act on and the picture may afterwards be freely exposed like any other drawing. ....

P.S. On trial the Hyposulphite appears to answer perfectly the end for which I have above proposed it. It discharges completely all the Silver from the paper except that which has been reduced by the light. moisture renders the chloride infinitely more susceptible of light than when dry. What a beautiful mode of making the Sun represent its own spots 2 times a day, or of mapping the moon.

39.3.30.

13.

(Cordelia Y. C. H.)

1839. Jan. 7. I sent just now a short letter to my Nephew to be enclosed in a packet to Köhler and now I am tired.

May 20th Hauptmann Müller came to tell me of having found a conveyance for the 7ft Telescope to be sent to my Nephew.

May 21. Mr G.B. Haynes called in the forenoon to look at the painting cases, and soon after sent for them. He assures me that they will be safely delivered to Mr Stewart in London.

[Mr Taylor of British Legation. Miss Emily & Miss Ann Halkett called.]

June 5. Mr Taylor & Miss E. Halkett called in the forenoon. Mr Taylor to take leave on going to England, he took the keys to the 7ft telescope with him and will take care to deliver them to my nephew or send them by safe hands.

June 9. [There was a General Halkett, for General in H. called. They are Excellent beings. (Mrs Wm Clarke (sister of General H. & Miss Halkett) & youngest brother Halkett.]

July 3. Franklin Halkett the Bride of Freiherrn Dörnberg came to see me.

Oct 25. Miss Beckendorf came in the evening for half an hour on business in consequence of a letter rec.d by Dr Müller from my Nephew.

Oct 30 I rec.d a letter from my Nephew this morning for which I have looked with no small anxiety for several weeks past. Thank God my dear niece finds herself as well as usual after having added a Daughter (Mrs S.H !!) to the young family on the night of Oct 22. The letter has two dates Oct 23 & 25.

Dec 5 Dr Fitton (?) from London brought me a letter from my niece & he gave me very comfortable accounts of my Nephews & Family's well-being.

1839 Feb 9. To Fox Talbot. (much altered) ".. As Daguerre has obtained his prices for his secret of course it will soon be published, and I am told his performances are so exquisite as to be almost miraculous. . So far therefore from having now the smallest objection to your mentioning either publicly or privately my application of the Hyposulphite to washing out the silver I rather wish it to be.

1839 Feb 12. To Fox Talbot. [.. The Chemical rays from the sun form a spectrum of their own .. not identical with the spectrum of Calorific etc, (much might be copied here if of real interest)] .. Feb 13. I have discovered your method of fixing, or if it is not yours it is equivalent. The Ferrocyanate of Silver is not affected by light. Therefore the further action of light on nitrated paper is prevented by a wash of Ferrocyanate of Potash. I was led to try this by this reasoning. etc etc (Might be copied if desirable)

1839 Mar 23 To Buckland [Declining Savilian.]

1839 Mar 31 To Whewell .. The Naval expedition is certainly resolved on & two ships the Erebus & Terror are named for the service. ... Under these circumstances Ross urges the ordering of his magnetic instruments. We want no more formal deputations or interviews but somebody wants a pig. Is not Peacock a personal friend of Sperm Rich ... (Pray shew him this, it is written to you both for I have been letter-writing since 3 a.m. this morning & my fingers ache too much to transcribe all this rigmarole)

TO J.D. FORBES. 39.3.30

The correspondence, arrangement, and dancing attendance consequent on the Magnetic undertakings advocated by the B Association and since taken up with decisive effect by the Royal Society together with a perfectly overwhelming mass of miscellaneous correspondence have occupied and are occupying so very large a share of my time, and cause so very great a distraction of attention that so far from being able to take any efficient share in this matter, I have been entirely disabled from advancing a step in the reduction of my Cape observations, which remain precisely (with one most trifling exception) in the state in which they were when I left the Cape.

1839. Apl 6. To Phillips. [re a syphon Baron: of JFWH's invention.]

1839 Apl 12. To W.H. Sykes. Refusing an office (probably Savilian) That the office in question with its appurtenances is a considerably lucrative & a very comfortable one involving duties which I would discharge without becoming obnoxious to any remarks at no great sacrifice of time & thought, I am perfectly aware & was so that I might consider my election as morally certain.

But with the publication of my South African Observations (when it shall please God that shall happen) I have made up my mind to consider my Astronomical career as terminated - I have several distinct warnings that I shall no longer have health to encounter another set to with a mass of Astronomical labour, and I will never be a sleeping partner in anything I undertake.

Note Caroline C L H's

1839. July 16. The whole of yesterday I had no other prospect but that it would have been the last of my days of sorrow trouble & disappointment I have spent from the moment I had any recollection of my existence which is from between my 3d & 4th year and etc etc it is of no use to recall the fear and anxiety in which I have spent the last week.

July 22. In the night of the 14th & 15th I was so overcome by my Hemmoroidical complaint from which I have suffered these 40 years, (and for which I know there is no cure) that I fell out of one fainting fit into another, and when I came to my recollection between 6 & 7 in the morning I found the etc Dr Gronkoff sitting before me talking loud in his usual nonsensical way. Hein had Betty called in her fright as the only Being in Town belonging to me. For his wife (who is nothing to me) and of use to no body is gone to spend the Summer months in the Country, Madame Kruffrigg also has been spending a couple of months at Baden & is now for a few months at Lachen.

23. This is now the eight day which I have spent expecting every moment a return of that suspension of life C L H

1839 Apr 21. To Lloyd (of Royal Irish Acad): ... I shall go to Paris shortly & shall be glad to make any communications you may suggest to the Parⁿ Savans. I start May 1st. ...

1839 Apr 22 To Fox Talbot. ... Many thanks for your photograph fixed by Iodine .... I wish I were learned enough to thank you duly for your work on the antiquity of Genesis ... etc. ... [Also much about the details of printing photog: on paper.]

1839 Apr 27 To Fox Talbot. ... I hope you got my last specimens. I wish I were not hurried to Paris as I am convinced that one or 2 days more on this new scent will lead me to some most valuable conclusions. For the present therefore I must conceal the my process but NB. The materials are all of the most ordinary and abundant sort, no Bromine, or any chemical rarities ....

1839 June 5. To Lord John Russell. ... Any objection to the insertion of my name in the list of Fellows of the London Univ? — one objection ... the responsibilities of a very important public kind ... I request to be allowed ... to ascertain more particularly ... the nature & extent of the duties published.

TO ARAGO. 39.6.25

à 27 mai There is only one slight phrase in the article in the compte R. to which I have alluded, which seems to me to require further remark on my part, it is that in which you speak of me as "m'étant occupé avec succès du perfectionnement des procèdés recomandés par M. Talbot." Whatever small degree of success may have attended my processes, I must in justice to myself observe that every part of them has been entirely my own and that I have borrowed nothing from Mr. Talbot although it is true that in prosecuting independently this enquiry I have fallen upon many of the chemical peculiarities which form so interesting a part of his researches.

1839 June 30. To Stockenstrom (of Cape Colony) [A very long letter on the political impasse in C. Colony, of which the gist is that J.F.W.H. advises St. to retire & work elsewhere.]

1839 July 5 & 6. To Fox Talbot. [Considerable corresp^ce on the spectrum & photographic results. See reference to this in letter to Oersted July 29/39.]

Oersted 39.7.29.

Up to the present moment, since my arrival in England from the Cape, I have not found a single week in which I have been able to commence the reduction of my Cape observations - which remain literally in the same state in which they were on my leaving the Cape, with the exception of a few trifling photometrical results.

I have had occasion to make a very singular observation on the chemical effect of the rays of the Spectrum. It is to this effect. Let a highly concentrated Solar Spectrum be received on sensitive paper. Then after a minute or two of exposure, it will be found that the paper is not merely blackened but impressed with a coloured picture of the Spectrum. The red is pretty vivid, the green and blue very sombre and they blend into almost blackness as we approach the violet, when a lilac tint again appears. The total want of Sun of late has prevented my pursuing this very interesting result.

1839 Aug 4 To J.W. Lubbock. [re Poisson's paper (on magnetism) & its bearing on the Ross's expedⁿ] ... my own engagements will certainly not permit me to undertake it (i.e. a Report on above for Committee of expedition), I have the Report to draw up of proceedings in the matter for the Birmingham Assoc^n Meeting (Brit. Ass.), the Actinometers to compare (a most tedious & tormenting operation in a climate like this where day after day's work is cut short & frustrated by sudden cloud, of those few days when Sun does appear at all, and for which it is necessary to be on the spot & on the watch) & their reduction tables to construct & the indices of the various calescence of their glasses to determine by experiments, to say nothing of private business of an urgent nature which I cannot now defer without much serious injury. (Ellingwood Forecham.)

1839 Aug 6. To Whewell. (respecting Report to Brit: Ass of activities of the "Meteor: & Magnetic Committee" of the R.S.)
...The expedition will be about sailing when the Brit: Ass meets .. I wish, if you & Peacock like draw up this Report .. and much relieved shall I be when it is made & the Exped[n] sailed. The affair has eaten up a year of my life & thrown me back in all my projects & in some irrecoverably.

Apropos of private business - I am not without hopes that we shall soon come to the end of our present homeless condition at least I have seen - like- and am treating for the purchase of a place at Hawkhurst in Kent. The place is rather more than I should have wished and has more land than we originally contemplated - but it is in a most lovely situation which makes it very tempting. However there is a 3rd. party who has refusal of it - and supposing him out of the way we still differ rather largely in respect of price, which will necessitate some journeying to and fro examinations on the spot &c. &c. &c.

1839. Aug 28. To? .. will you mention to the Physical Section of the Brit: Ass: a very remarkable property of the extreme red rays of the Prismatic Spectrum .. (they) not only have no tendency to darken the prepared paper but actually exert a contrary influence. ... I have long suspected this to be the case. .... It seems to me evident that a vast field is thus opened to further enquiries. ....

1839. Sep 18. To J.H. Tredgold. [Refusing, lest political bias should be imputed to him, to take the Chair at a Public Dinner to Capt Stockenstrom who had been removed from his position at the Cape. — Speaks highly of Capt S.]

1839. Sep 10 To Fox-Talbot:
(might be copied in extenso as first reference to taking prints from glass negatives?

1839 Oct 9 To Airy (draft) ... Have been at work on production of colour by Chemical rays. ... (These notes might also be copied in extenso.)

1839 Oct. Draft. To M. Hall. [J FWH's views on F.R.S.'s lending their name to a paper on a subject with which they are not conversant. Also that far from the R.S being able to patronize the writer of a Paper, he is honouring them by communicating new facts.]

1839 Dec 14 To R. Hunt [who makes photographic paper for sale.] re J F W H. forthcoming pamphlet on action of coloured media on Chemical rays.

1839 Dec 15. Sabine. .. [Re Lloyd having taken offence at Lord Northampton's (P.R.S.) Address] " We must take the R.S as it is. We cannot have a President who shall at once be a man of that personal influence with men in power which only rank .. can bestow a man of general science & eminent in some one of the great departments of it & who will give up his whole time and attention to the business of the Society. ... We must close our eyes to obvious errors & oversights. Without Lord Northampton's personal intervention, I feel ... that the magnetic project would not have been adopted by the Ministry. In former days when few applied to Science somewhat might be subtracted from the sum of a individual attention to a man's own peculiar branch of study without materially subtracting from his chances of distinction or hazarding his claims of priority. Now it is different indeed. The competition is increased to that point that every moment diverted, is either an advantage given to a rival or a consenting to mediocrity. ... Our friend talks of his Sacrifices, but they have been made to his own subject, ... For such objects such sacrifices are the appointed price. I too might speak of sacrifices made in the same cause, but that cause not of my own choosing & to the already inseparable detriment of my scientific position. But I am not desirous to enumerate them .....
P.P.S I have not time to read this over as we have our house full of a Christening party (M.S.H !! M.J.H.) Doubtless therefore there are in it expressions which on quiet perusal I should alter. But I trust they will stand explained by the general context.

1 Jan Extract from Report

Purchase of Collingwood

9

Red Ray does not affect sensitive paper

Sir Lowes Dickinson Banquet.

Glass negatives

Coloured Fluids

F.R.S. Honoured by the Most

Lloyd's Succession

Sabine

1840. Jan 10. Mr Taylor & Fraulein Hallatt (fiancée?) were here. Mr T. to take leave to return to England. He took a letter with him to my niece

CLH

Candidate's Hall

1840. March. I received a letter from my Nephew & the enclosed for Col Miller I sent him immediately [12th Col. M. came to thank.]

April 30. Dr Grossk. called having seen something in the Postscript about my Nephew's Verses very favourable.

May 17. Candidate Haase brought me a letter from my Niece.

25. Fraulein Wilke brought me the Translation of my Nephew's verses.

June 14. I wrote in the evening to Mrs Beckedorff for the last time. Miss B. has promised to write to my dear Nephew & Niece when I am (? dead)

July 22. Grosskopf came to read me a paragraph out of some papers by Professor Müller about the translation of my Nephew's verses by Minnie Wilke.

Dec 20. Miss Clarke read the letter to me which I received this morning from my dear Niece else I should not now know the comfort to know that the dear family at Collingwood are all well, for my eyesight is so bad that I cannot see my own handwriting.

CLH

carbon May 14 1833 (Sir John Lubbock, allow me to suggest to you that you do wrong in thinking, and writing upon the President's desire to procure a knowledge for you to form the Council in a gov't vessel, say a man of war.

1839 Dec 16 To Sabine. ... I have laid it down as a principle to take no initiative or directive step in matters which concern the interior organization of the R.S. ...

40.6.28.

TO H.C. OERSTED.

In return for your elegant verses I have nothing to send you but the little requieum over-leaf, which was sung by all our little family in chorus at noon Jan.1.1840, being the commencement of the Astronomical New Year. The Tube with the Reflector and other apparatus, included and firmly rivetted up, is now placed horizontally on three stone-capped pedestals, and a neat flower garden being planted round it, looks very well and will remain its own monument.

1840 July 13. To Struve. ... The last two years of my life have passed in so unsettled and distracted a manner, I have been so harassed with desultory & importunate calls on my time & attention, that it has been impossible for me to collect my ideas so as to resume the thread of my correspondence with many of the friends I most value and esteem ... Since my return I have made no observations .. so totally have circumstances over which I have had no control distracted my attention from its proper objects amongst other things I have .. been involved in a change of residence. My increasing family (7 children) & the near vicinity of London which the operation of a railroad brought within half an hour's journey obliged me to look out for another house ... and I have at length begun seriously to get to work upon the reduction & publication of my Cape observations.

The principal Astronomical result which I have arrived at of late is the variable nature of the Bright Star Orionis which I am surprised has so long escaped the notice of Astronomers - since its light when at the Maximum is equal or superior to that of Rigel and at the minimum inferior to Aldebaran. But its Max. and Min. are not always alike. The minimum this spring for example was never so low as Aldebaran - but about a third of a magnitude or a grade above it.

1840. July & Aug. To Sir J. Herschel (at C.G.H.) (about Cape affairs & Capt Stockenstrom) & JFWH to evidently bent on calming down a misunderstanding between the two estimable men

"Lord Normanby into a petulant fit of whispers"

1840 Aug 6. To Whewell. ... Your book is a tough one. When I summate it Chapter by Chapter I shew the ebb of both sweet & bitter fancies. You are too "a priori" rather for me - As soon as one has worked one's way up to a general law you come me cranking in and tell me it is a fundamental idea innate in every body's mind, a necessary truth or very likely to prove such a one a thousand years hence, but of this more anon. There is excellent matter in it. Your suggestion about the Crystallo-chemico-geometrical espacement of atoms will turn out one of these days a great scientific discovery, or cause somebody to make one.

1840 Aug 10. To Prof. J.D. Forbes. .... that one day we shall see with Physical Observatories & experimental Institutes established in every civilized nation I doubt not. But the plan ought to be well matured & food before it is presented & the public mind prepared.

1840. Aug 13. To H Bunbury (re correspondence about Stockenstrom & Sir J. Napier (Govr.)

1840. Aug 14 To H. Lloyd. ... Mr Airy has written to me for information about the building for Magnetic purposes at Greenwich (please send him details)

1840 Aug 15. To Sir J. Napier. [Very long letter on the rights of "l'affaire Stockenstrom" drawing by Lr. Normanby who said he was unpopular at the Cape. JFWH was evidently considered a good go-between amongst all the lacerated feelings of the parties concerned]

1840 Aug 17. To Sir A. Stockenstrom Bart [A soother to him as regards Napier.]

1840 Nov. 1. To H Lloyd. ... From what I have seen of the difficulty of getting a body of men however zealous & intelligent to think in concert & concoct a well-digested publication I am satisfied that except you yourself tell us distinctly what is wanted .. it will not be satisfactorily done & not done at all, but at an expense of time & harassing attendance on the part of all concerned of which the "Report" has given me at once a clear notion & a dread.

1841. Jan. 5. Geheimrath Lichtenberg paid me a morning visit & left me a message to my Nephew which I promised to send by next Messenger

Mar. 2. The Generalin Hallart came from 3.30 to half past 4. She brought me the News that my Niece had on 21st Feb. been confined with a daughter. Grant that I may soon have accounts of her doing well for I fear this has happened before her Doctor's etc Arrival.

Apl 19 I received letters in the morning & was very happy of course, but had the afternoon disturbed by a visit from a foolish woman (Madam Arbuckle) who comes rather more often than I like.

C L H

W. Wallace 40.12.16.

Since I became a married man and the Father of a family I have found that Sombre Familiars of the description you allude to are rather a subject of suspicion, jealousy and distaste - so that though I sometimes heave a sigh and drop a tear over the memory of that dear departed cherub (a black kitten the plaything of his boyhood[x]) I have preferred to leave her place vacant - and though her image sometimes presents itself in dreams no purring successor is now suffered to repose on my rug or climb my shoulder. Two ill-conditioned, annoying and mischievous Tabbies make rather the blank more sensible. But you will call me Katerfelto if I go on in this strain.

41.1.13.

TO SIR PECKHAM MICKLETHWAIT.

My views respecting my proposed nomination as a local Magistrate and a most earnest desire on my part that my name may be passed over in any nomination that may take place.

The pursuits to which my life has been hitherto entirely devoted with, I may say, no interval of relaxation, and in which I feel myself, on the whole, more availably and usefully employed than in any other mode, have entailed on me, for years to come, duties and obligations from which there is no shrinking in the form of great masses of intellectual labour, to be executed, in which I can receive little or no assistance, and which demand an entire concentration of time and faculties. It is with the object of devoting myself uninterruptedly to this work, that, (refusing offices both of honour and emolument urgently pressed upon me) I have returned hither - and this object I feel would be completely defeated by what is proposed. Whatever might be the case with men differently constituted, I have the fullest conviction in my own case that the frequent and imperative exigencies of the Magistracy would break in, most destructively on that even routine of daily labour which is henceforward the only condition on which those other duties can be performed.

1841. Jan 28 To Sabine. ... Of the necessity of Publication there can be no doubt (referring to the Observ^ns collated during the by the Magnetic & Meteorological Com^e of the R.S) The records of one of the greatest - perhaps the very greatest scientific operation that has ever been undertaken ought not to be consigned to the casualties of time & accident in Manuscript, nor can their full import be extracted either by one theorist or in a single generation. They ought (like Astronomical Observ^ns) to be at once secured from loss & rendered accessible to computists of every age & nation. (Good to be applied to Sir Isaac Brant-in-Air)

Dates out of Order

1840 Feb 5. To Lord John Russell. [Upholding Capt^n Stockenstrom's character at C G H.]

1840 Feb 7. To Hodgkin (C G H?) ... As to ultra frontier affairs they are beyond the deep sea line of my understanding. I can only hover & wail over their turbid waters. Were it not for a firm belief in a guiding & over ruling Providence I should think that some influence the reverse of Providential presided over them! ... .

1840. Feb - To Whewell ... Jones tells me you are just getting out your book & that there is heresy in it! I long to see it!

1840. Feb 9. ... To T. Baily. ... I find I have some knowledge of Sir T. Knowles and hope I may be able to avert his expulsion. ... the expulsion of the 3 members which after all is a pretty strong measure & on which it will not do to break down. I have a letter from Plana who writes in ecstasy about the Medal.

1840

Carbons.

Dates out of Order

Mar 3. 1840 To Prof. Forbes (Edin.) ... I have fallen on a mode of preparing paper so as to render it capable of receiving a visible a measurable impression from the Thermal rays of the spectrum with an absolute certainty that the chemical rays or those which discolour salts of silver etc - are no way concerned in the effect. In short it may be called a thermographic paper which will afford a valuable means of analysing "Melloni"s & your own results so as to see what share each ray of the spectrum bears in producing the observed total effects which so far as I am aware is yet a desideratum. (more details)

Mar 3. 1840. To H. Fox Talbot. (Almost similar subject.)

To Sir J.L. [on Mar 15. 1840 rec'd - a peppery letter from Sir J. John Lubbock concerning the Lunar Theory because he was not mentioned in J.F.W.H's Presidential Address to R.A.S.] Refers Sir John Lubbock to Quarterly Review January 1832 Vol 47 N° 95. p 546. "to judge whether whether I was likely to avoid any opportunity, of speaking of your elaborate & profound works, which might offer itself." - [the letter ends by a well-turned rebuke to Sir John Lubbock for expressing peevish dissatisfaction at not being personally mentioned]

1840 Mar 9. To J.W. Lubbock. ... If a Balloon be sent up by the Brit Ass. it must be a good large one as all the Members will be candidates for a ride.

1840 Mar 13. To Christian VIII. King of Denmark. [Whose name was added to Patrons of the R.A.S. He maintains Obs^tory at Altona (then in Denmark) & subsidizes Astron^l Nachrichten.]

1840. Apr. To Whewell. ... My future address is. Coll^e Hawk. Kent. A Rye Coach goes Tuesday Thursday & Sat: from Bolt-in-Tun, Fleet Street at 11 a.m & reaches Highgate a short mile from us at 4½. There is no other conveyance but the Hastings coach & through Hunwell 6 miles from us.

1840 June 10. To ? Sec of Subcom^tee. In my opinion the R.S will henceforward (for my remarks do not apply to bygone times when observers were few & required the stimulus of example) always deviate from that line which best accords with its dignity & utility when it meddles in its collective capacity with the business of practical observation. Laws & theories, the purely intellectual part of Science seem to me its true sphere. In observation it should never engage, in experiment seldom & only on remarkable occasions. "Tu regere imperio gentes" is a motto I would apply to it in the metaphorical sense of intellectual rule. ... I should therefore recommend the discontinuance of the Meteorological observations hitherto carried on at Somerset House ... the reason which did exist, exists no longer. ... There is actually established a Meteorological Society whose duty it is to set a perfect example of the best possible observations of this nature ..... Science is now on a very different footing from what it was 50 or 100 years ago ... & the R.S will have enough to do in the great tasks which will engage its attention for the next half century ... As regards the plan for "establishing by public authority" a simple but accurate meteorological register" ... ~~on the whole~~ ... I should be sorry to see any small & premature steps taken in this direction which I think would tend to defeat rather than to advance the general object. On the whole I am disposed therefore to recommend no immediate steps .. but to muster our strength for a much more widely extended measure.

1840 June 28. [Won't join any more Soc's. as it is there he is in, an utter neglecter, or causes him to neglect work he wP- far rather do.]

1841. Oct 20 Mrs W. Clarke & Mr Leach came in the forenoon. Mr L who returns tomorrow to England takes my Diploma with him which he will see that it safely comes in the hands of my Nephew.

May 19. Letter from my Niece dated May 10.

Nov 16. Franklin Miller came in the forenoon to see me. In the afternoon his eldest sister came to return the address of my Nephews J.H. on the presentation of the Godfrey Gold Medal etc to Professor Bessel.

June 30. 1840 To Lubbock. (re. the proposed Physical Laboratory & suggesting Sabine as the Head.)

July 3. 1840 To Lubbock (JFWH. is surprised that R.S passed Phys: Lab: with a thin Meeting to applied to Govt without telling out side members.)

July 8. 1840 To the Sec of R.S ?? (JFWH's views on Magnetic Observatories & Meteor? Observatory)

Jan 20. 1841. To Capt Beaufort. [Lacaille's Arc of the Meridian at the CGH shd be remeasured.]

Jan 15. 1841. To Capt Sabine. [Detailed letter on the routine for the magnetic observations all over the world, also he thinks this best settled by correspondence: "mature reflexion in the closet .. is more important than the most lively interchange of conversational ideas. ... they shd keep quiet in their corners & brood over their ideas & concoct their theories in peace, provided always they do brood & concoct." .... "Should Humboldt's dinner take place you may be sure I shall attend. ..."

1841. March? Fox Talbot. ... You are quite right in patentizing the Calotype .. and I must say I never heard of a more promising subject for a lucrative patent. ... [long philosophical argument, in the course of which he says for FT's benefit: Physical Truth is independent of a recognizing mind. Logical Truth is not. — Also a dialogue on the "Finite Extent of the Corporeal Universe."

1841. Apl 6. Whewell. ... The immediate work I have in hand is a review of your ~~book~~ Philosophy ... it has led me to bring into question all my own preconceived or habitual opinions & knowledge acquired by reading, to reject much, modify some & retain what I do retain in a shape such that I hardly know it to be the same. That I can no-how bring myself to coincide with your a priori views, you may probably easily enough divine :: Of course I am bound to say why. ~~But stupid~~

But as to the main questions in issue we begin at diametrically opposite points and meet only in our central love of truth; so that I fear, talk as we might, or write as we may we shall never convert each other. We are like two staunch politicians Tory and Radical, who agree in love of country and whom a thousand delightful associations keep from tearing each others eyes out.

And so may we soon and often meet on neutral grounds, of which there is no want, and drown our differences about the abstract and the concrete in a sea of thoughts and feelings which will never fail us when we get together. For example can't you run down from Cambridge or wherever else your nod may be shaking the spheres, to this same Christening as is to be. You are young and locomotive and can do such things. I am old and stupid and think more of a journey to Town now than I can well account for. Our time shall within reasonable limits be yours. Miss Maria Edgeworth and our admirable and excellent Mme. Gerlach will be your God-wives on the occasion should you accede to our prayer. I say God-wives to save decorum. Children are effects of matrimony - and effects call aloud for causes. Here, by the bye the other day, we heard of a strange case of the kind where the effect preceded the cause. What think you of that ?

1841. Apr 27. To E. Sabine. As you inform me that my opinion is required as to the scientific & practical importance to be attached to the magnetic & meteorological observations in progress .. at the expence of Government, ... Terrestial magnetism is that of which all the sciences of observation holds out the greatest present prospect of decisive reduction under the dominion of exact theory. Indeed its theory is no longer one in nubibus [Long letter on the practical utility of these observations.] most interesting. ... the decided support afforded by Britain to this object has called into action similar establishments on the part of Russia Austria, France & the United States as well as of several other Governments to an extent nearly ten times that directly afforded The East-Indian Co has been acted on by the same powerful example .. The total number of Observatories set in activity in consequence of the example of Britain amounts already to 35.

1841. May 31. To de Morgan ... we are so dreadfully physical & practical nowadays that there is danger of seeing the merely abstract quite neglected ... .

1841. June 20. Oersted. [Thanking King of Denmark for making him K.C of order of Dannebrog.]

1841. July To Whewell [Congratulations on his engagement &c - Marshall.]

1841. July To Fox Talbot [Whose paper on calotype was not printed in the Phil. Trans:] ... But the fact is that the Council of R.S though composed for the most part of individuals who mean only what is good are yet as a body strangely apt to get into hampers for want of due consideration of the bearing of cases which come before them. .... I have on a great many occasions felt disposed to complain of the inconsequent and indefinite way in which the business of that Council is conducted. It is a body very difficult to keep right without exciting irritation by perpetual remonstrance. On this occasion it is impossible that any slight can have been intended & I should gladly hope that you may be disposed to regard the whole affair as a mere gaucherie.

1841. July To Fox Talbot. I have been preparing a parcel of Reports for the Brit Ass: .. which has prevented my doing anything towards getting my Chemical preparations into action or doing anything that requires the use of reagents except such as happen to be ready at hand in a few loose bottles turned up out of a sort of chaos in which state all my chemical concerns have been ever since I left Slough having never had time to unpack & establish them ... However in this desultory way I blundered not long since on a curious enough imitation in vegetable photography of your calotypes.

1841 Aug 10. To Lubbock. [re Fox Talbot's Calotypes Paper rejected by R.S. Fox Talbot said it was first sent to R.S but the French academie who had it later were more prompt & read it earlier. (P.G!! hm?)]

1841. Aug 10. To Sir G. Grey [re The Kaffirs &c Colonial Education.]
[This letter should be copied in full.]

1841. Oct 10. To Stokes .. You have probably heard by this time of the frightful accident which nearly caused Mr Baily's death. He was knocked down & kicked on the head by a horse furiously ridden by a newspaper express. For a long time his recovery was very doubtful. He lay long insensible & delirious in a Hospital but being in a state to be carried to his home. It is now about a month that he has been declared out of danger.

continues under

same letter continues

aug.
41.8.10..35.

TO..Sir J. Napier...(copy the whole letter.)

Sometimes I almost feel inclined to wish under the influence of such an example that it had pleased God to turn my own course of life into some field of direct and active exertion in place of the merely contemplative one in which my lot has been and will be henceforward cast.

41.10.10.

TO W. STRUVE.

Communications with friends whom we esteem and value, get put aside from day to day as we advance in life by the more importunate, though intrinsically far more trifling claims of the passing moment - till after a lapse of months the interval stares us in the face and fills us with regret.

In particular I ought to have thanked you before this for the very superb Pulkova Medal which, as a Memorial is indeed every way worthy of the ocassion it commemorates, and which I consider it a great honour to have been judged worthy to receive at your hands, and which will descend as a heir-loom in my family, I trust to be prized by my son even more than by his Father.

A numerous and increasing family is a great preventive of travel, - nor do I find my health now such as to allow of my contemplating long journeys especially in your Climate, however warm the welcome which I know I might expect from your friendship.

→ visit

I am very glad to hear that your Son, M. Otto Struve is likely to tread in the steps of his Father, and continue for another generation the name of Struve as a living and a working one in Astronomy. May you yourself long continue the animating and directing Spirit of Pulkova, and when in the course of Providence that can no longer be, may another Struve propagate onward the impulse you have given - to perhaps yet another generation!

The reduction of my own observations proceeds, steadily but slowly. I have every part of every calculation to execute myself - and our change of residence, with the change of habits and arrangements of every description it has involved has acted as a most serious drawback on a publication which I hoped to have completed long ere this. Add to which, in England the attention of no man is suffered to rest with that constancy and steadiness on his own pursuits which is the only sure guarantee for the production of any great work requiring thought & care.

1841. ... To Schumacher. ... It is singular how generally prevalent the opinion is that both my Father and myself have admitted the idea of the Moon's influence on the weather & published predictions of Weather-Tables founded on such presumed influence. But there is not the shadow of foundation for any such idea. Thirdly

The only way in which I have ever connected the Moon and the Weather is by a casual remark that I have very frequently observed a full or nearly full moon (i.e. sensibly round) to be accompanied with a sky serene and cloudless or nearly so, at or within an hour or two after its rising so often indeed that though I do not pretend to see any rational connexion, I cannot help thinking that there is something beyond accident in it, and have therefore recommended it to Meteorologists as worthy of some notice for the future.

.... The poems are by Miss Hamilton a sister of the Dublin Astronomer who has a singular gift that way..... It would be awkward & indecorous on my part (to address a letter to the King of Denmark) for it appears that no British Subjects can be permitted to accept any Foreign Order or even possess its insignia, on receiving this notification I, of course, addressed to Count Brahe (from whom I received the Patent etc) such a letter as the occasion required accompanying the Cross etc of the Order.

41...

TO W. WHEWELL. 41...

I am at last making play in my Cape ~~educations~~ and have begun to teach Alex. Greek (before Latin) and Willy Latin before Greek, with what success in the latter case judge by this his first letter to me:

"Carus Pater, - Est longus tempus non scribui tibi - scribam tibi Latina. Hodie est pluvialis, Sum tuus filius."

1841 Dec 3. To Quetelet ... One need only look at your projection of the 36 hours series (of Meteorological Obs^ns) for March 1841 exhibiting as it does, almost a model-in-relief of the surface of the atmosphere over Europe & Italy to be sensible what a serious diminution of interest would have been experienced & how much positive knowledge would have been sacrificed had the observers desisted from their observations at 6 p.m on the 23^d instead of continuing them up to 6 a.m on the 24^th. How completely, for instance, the decided subdivision of the atmosphere into two Oceans or Atmospheric Basins by the Alps would have been lost to view by such a contraction of the Series. [Observer: Mr Waterhouse at Halifax ? a relation of JFWH ? no JFH.]

... Lastly I must entreat you not to consider me wanting in appreciation of your extraordinary zeal" if I continue to adhere to my determination ... to confine my own personal share in the execution of these observations (etc) .. to the interval between 1834 & 1838. To engage in the immense labour & detail of Meteorological pursuits is quite incompatible with the objects to which in Science my chief attention ought to be directed.

1841 Dec 23. To J.E. Bidwell [. Bidwell has asked JFWH opinion as to whether he wd be well advised to sink his ward's capital in purchasing Daguerre's Patent rights in England. H. replied it depended on the sum, the dexterity & chemical knowledge of Operator & his diligence at] .. I think it a duty to state to you that I certainly do consider that very great & most essential improvements are extremely likely to be made not only in the art of Photography generally but in ... Mr Daguerre's patent. etc.

1841 Dec 24. G. Grey (Gov^r of S. Australia) .. I understand your book is making quite a sensation in London ... I am quite proud of my range of mountains as it is, I think, the first time I have figured in a map of the world. I hope among the more interesting & responsible duties of your situation in S. Australia, you will not lose sight of the preservation & identification .. of the aboriginal dialects - - - .

(more might be copied — on Standard Wts & Measures ... Magnetic Survey ..

TO H.C. SCHUMACHER. This should be 1842-1.17

It may have been that I should have done better in the first instance, not to have applied at all for the Royal permission to accept the order, in England. But in the first place, Count Brahe informed me that this was necessary - and then, on making further enquiries I was informed (as it appears, erroneously) that such permission would be granted as a matter of course, or at least was not likely to be refused, on my application.

I was therefore by no means prepared for Lord Aberdeen's refusal, and as that refusal was official and accompanied by no explanation beyond a simple enclosure of the printed regulations, I considered myself, as a British Subject, bound to act according to their strict interpretation, however repugnant to my own wishes, which would certainly have prompted me, as you say, to have retained the Order, but not to wear it or assume the title.

But is it not something curious that the regulations of courts in matters of this sort should not be mutually so well understood as to preclude the possible occurrence of contre-tems of this nature ?

As to my Father's Order (and my own) as a Guelphic Knight, to which you allude it is indeed a Foreign order but having in both cases been conferred by the King of England it is not a case in point. How it is that the King of England confers a Hanoverian order I do not know, but such is the fact. Of course there must be an understanding to that effect between the Courts.

1842. Jan 2. To L.M. Brisbane. ... The highest & for the most important pursuits of Science, those which are directed to the improvement of its theories, are in a very remarkable degree unremunerating and the man who devotes himself to them with a determination to give his genius fair play must lay aside all hopes of fortune & regard himself happy if he can secure a competency. ... An extension of the Royal Bounty in his (Prof: Forbes's) favour .. would be regarded .. as a benefit conferred on Science itself..

1842. Jan 6. To W. Whewell. [Serio-comic illustrated letter. This should be given in extenso]

1842. Jan 7. To King of Denmark ✱ (not allowed by etiquette to accept Decoration.)

1842. Feb-. To Sabine. ... The Council of the R.S is the body which acts & manages the business of the scientific Committees is solely to advise the Council on their several subjects, they are essentially deliberate & capitulative bodies .... I would have written to him (Sir J. Lubbock) to the same effect but that really I have got to abhor as a physical evil the act of writing 4 pages full of paper." ( )

1842. Feb 9. To ? Sec. Physic Com: R.S ... "Mr Airy has a decided objection against the use of A.M & P.M in publication. At the same time he is of opinion that we cannot use the 24 hours progression in civil time ... " on this point (says J.W.H) my own opinion agrees entirely with the astronomer Royal's. There ought not in Science and in the same nation to be two reckonings of Time.

Mar 16 .... (red-hot of flowers &c) ... afterwards they came all to see me and examined till dinner time which prevented me from reading the comfortable letters which were handed in just when I had finished arranging the flowers and cards.

Sept 12. We sailing with messrs from Geneva.

C.L.H's

Astronomers work for posterity

TO W.H.SMYTH. Capt. R.N.

It is for posterity that astronomers work. Two and a half dozen people in each generation, till England and English Science is forgotten, will make a fair muster all together.

Airy tells me you are leaving Cardiff and looking out for a house nearer London. Why not settle in Kent, where the sky is truly Italian when it is clear. Never did I see such nights as here, in England, rarely in S. Africa.

42.6.2.

"Sapphire" blue Ha!

1842. May 26. To W.H.Smyth. ... I see you use "sapphire blue". It is a pretty poetical word but as the Sapphire is only blue in one direction & the tint passes to yellow in others it is perhaps the most undefined word to express blue that could have been selected.

Bessel to come to Collingwood see July 8.

1842 June ... To Bessel (aged 58 died 1846) .. I had no intention of coming to Manchester (Brit Ass in 7th) but your presence will certainly bring me there as I not only most ardently desire the honour and happiness of becoming personally acquainted with one so long and deeply venerated but I have a project to induce you to leave Manchester & established before the end of the Session which from what M. Schumacher says, will I fear prove too fatiguing for you a retreat with me to Hawkhurst. (we have also a railroad & the best in England) Owing to the illness of Lady Herschel .. I cannot possibly pass more than a single day at Manchester.

1842. June. ... To Wheatstone. (Arranging about Bessel, so as not to agitate him) Lady Dr Herschel is still very unwell though I am now in less alarm about her than before...

Photographic Exp.ts in Jan 29/39.

TO R. HUNT.

Sec. Polytech. Falmouth. 1842. June 2.

It is somewhat singular that of three substances which I find noted for trial as photographic ingredients in the original memorandum of my very first days experiments on Photography (Jan. 29/39) two are the Ferrocyanate and the Fulminate of Silver. The third is the Benzoate which I have now under examination. Both the others have turned out to be highly remarkable as sources of Photographic power.

Polishing 3 mirrors in one day by J.F.W.H

1842 June 16. To Steinheil. (Re gilding mirrors) ... On one occasion I polished 3 reflectors of 18 in diameter in one day (with my own hands) and they all turned out excellent. But then I had the benefit of my father's experience & the complete & elaborate register of all his practise before me.

J.F.W.H feels physically weak so will not take forward part in Brit Ass

1842. June 17. To Wheatstone. ... I have received & read your Prospectus relative to the proposed establishment of the Brit: Assoc.n at Kew ... in all such matters I have limited myself to the line of general advocacy & that on grounds which I could easily explain & defend. Now however that I can calculate on but a very few years more of scientific efficiency (& of those more than one or two already bespoken) I feel more imperatively than ever the necessity of confining of abstaining from stepping promi= nently forward in support of particular objects other than those in which I possess the individuality & feel the power of carrying out personally into execution.

1842 July 8. To Bessel. ...(We) look forward to the pleasure of seeing not only yourself but your daughter & M. Ermann ... we could travel down by railroad as far as Tunbridge and thence post, or coach it, the remaining 18 miles as you please. (further details of those travelling days might be wished.)

Travelling by coach

1842. July 20. Bessel .. (after his visit to Ellingerode) (Referring to an Order giving him by the King of Prussia which he feels he cannot accept in view of the affair of the Danish Order.)

1842. July 20. To Argelander. (At Bonn. Asking for intron to intellectual helps for the 3 sons Tunno & 2 nephews who have just left Eton.)

Aug 27 1842 To Baillie, re his picture of eclipse (Baily 1842 Sept) : As regards the phenomenon itself the first question to decide is whether it belongs to the sun as a body, i.e whether it be some real thing on the Sun or whether only an effect of diffraction in angles clefts or ruggedness of the Moon. [Further views which might be adduced as showing the then state of astron: knowledge.] Bessel told me that he considers it certain that the theory of gravity & the perturbations of known planets will not account for the observed irregularities of Uranus. If so, there is another planet & there ought to be a hue & cry raised – a division of the Ecliptic into shares & a thorough scrutiny down to 10 or 11 m of every star in each."

To G. Airy Sept. 1842. [more re theory of Baillie's beads & sun's flames.]

Sept 4. 1842. To Sabine. "To you also the creator of the actual reputed methods of observation (for the combined Magnetic & Meteor: Observatory) .. it is felt due to refer .. as to any alterations

An Order from King of Prussia

Baily's Beads

"another planet" to disturb Uranus.

Baily's Beads

Sabine to refer to Muhry

TO MUHRY. 42.11.10

I have been rendered very anxious of late on account of my dear and valued Aunt, Miss Herschel, perceiving in several of her late letters and especially in one recently received signs of an increasing feebleness which at her very advanced age makes me very apprehensive of the coming winter which seems already commencing here and which I dare say in Hanover where the winters are more severe than with us, has set in ere now. It is not that she complains of actual sickness, but there is a languor of tone and a continual reference to an event which has indeed no terror in her eyes but which yet she evidently contemplates as in very near prospect, which leads me to believe that (although the resources of medicine to prolong life beyond its natural term must be unavailing) yet that the time can not be far distant when medical attendance must be needed. At the same time I know her habits to be such as will very reluctantly admit the idea of receiving such attendance from any one, and would lead her to defer calling for it at the expense probably of much suffering or at all events of great discomfort which might be spared her by prompt attendance when the occasion shall arise. The great regard and confidence she entertains for you and the friendship subsisting between her and your family afford you, my dear Sir, the opportunity of watching over her state without avowedly appearing to her in your professional character, and whenever you may judge it necessary to assume that character I feel convinced that any reluctance of the nature I have attended to would at once be overcome by your mention of its being my earnest wish and entreaty for my own and Lady H's satisfaction as well as for her comfort that she will conform to your advice and that in fact you have been requested by me to attend her. However, it will be better, if it can be avoided, to avoid all mention to her of my having written to you on the subject, placing any frequency of your visits which may occasion remark, to the score of your friendship of which you have for many years afforded her continual proof.

Doctor Muhry to watch over Aunt Caroline's health.

I need not add that I shall feel particularly obliged by your replying to this letter and by your informing me of anything in which it may occur to you that I can be instrumental in adding to her comfort without offending against the marked peculiarities of her disposition which rejects as superfluities almost everything which the world regards as Conveniences and comforts. It is impossible for me as the season is so late, and I have many other duties to attend to, to come over and reside near her nor indeed do I think it would have any other effect than to agitate her unnecessarily. But you may easily suppose that I feel no common anxiety to fulfil every point of duty and regard to such a relative.

1843 Mar 26 Mrs Clark in the forenoon brought me a copy of my Nephew's
letter of Mar 18 copied from the Times. 1843 C L H

1842 Nov. 1. Argelander (about the brightness of stars) ... one thing ... surprises me very much .. you find Orion at present to be nearer in brightness to Rigel than to Aldebaran .. the point is important as it is evident we do not judge alike respecting the degrees of brightness of large red & white stars.

X (Lawson's Catastrophe, what?)

Nov 15. 1842. To Prof. Forbes (on Thermographic processes) " In my paper read to the R.S June 15 I have declared my opinion that in the act of vision the retina is photographed, impressed This, it appears is also Moser's view of it in his paper ... I do not know when that paper first appeared, I certainly had no knowledge of it.

Dec 5. 1842 To Dr Draper (New York) [about photography]: " As regards Mr Moser's reasonings on his facts & indeed on every part of photographic enquiry I must confess that I have seldom seen anything feebler ." [Also about Heat Rays.]

1843 Mar 25. Mr H. Fox-Talbot (about the Comet & Zodiacal Light) (About printing)

1843 May 21 [Long letter to Beaufort (with ? Mr H) on the practical requirements of Cape Observatory.

~~1843 May 21~~ ..... Having had no experience of the clock movement - so much advocated in Equatorials I have no right to form an opinion of its recommendability. For Comet Obs^ns it is clearly of no service.

1843. May 26. To A.J. Ellis ... looking on all mathematics & all geometry (as I do) as mere conclusions a particulari ad universale (which Kramp seems to have held in such abhorrence) I regard it as highly necessary .. to ascertain .. the limits of safety of our ultra general conclusions.

1843 June 5. Bessel ... I have got so much now out of the habit of following out mathematical investigations that I am almost afraid my mathematics will not carry me through (your second Volume) .... My own work is steadily though somewhat slowly progressing. I have been led to take a great deal of pains with a chart of Nebecula Major in which every Star of the 9^t^ Mag. & almost every one of the 10^ls^ are laid down as well as all the Nebulae. It comprises about 48 square degrees & the total number of objects laid down amounts to somewhere about 1000 (also data for the N. minor) (much reference to the proposal to change names of S. Hem. Constellations & stars.)

You have undoubtedly seized on the true features of his (Sir William Herschel) character viz:- Earnestness in the direction of his entire faculties to the accomplishment of his one and only object that of seeing as much as can be seen and understanding as much as can be understood of the celestial bodies. Perseverance in his efforts towards that end - and unwearying industry. These are (especially the first of them) eminently German qualities. Our English idea of this Quality is comprehended in the saying (sprichwort) that "What is worth doing is worth doing well" but the German notion of it involves something more and seems to imply that "nothing is worth doing that is not worth doing heartily".

43.6.22.

TO KELCHEN. (Local Council of Cork)

(Invitation to attend Brit. Ass. at Cork. Lord Rosse, President)

Lord Rosse to whom I consider the science of practical Optics to be more indebted than to any other living individual.

1843 July 28 [About Barometric waves. Useful to show trend of early meteorological letters. To Birt. a suggestion. But as Phenomena instead of Chronometer? But in vain. Aug 16. 1843 To Airy ... 2 years requested by the Admiralty to engage (6 ft focus equatorial) for the C.O.H. Meanwhile Airy and Mathieu their force ...; I delayed because ... I have had a great pressure of Brit. Ass reports to prepare which must be concluded by a given date & require undivided attention. (Then a long letter on technical details of telescopes.)

1843. Sept 2. [a long technical letter to Mum Murray & Mahler & above

1843. Sept 8. To W.H. Smyth. ... P.S I hope you were present at the exhumation of the Chelsea Elephants a Mammoth which must have occurred very near your present residence.

Oct 2. 1843 [A long letter re J.W.H.'s children's governess, who went out of her mind. Talk Shaba at Geneva.

Airy's Comet & Zodiacal Light. Comparison of diffraction & irradiation of Stars

Photometer & Eye.

Photography

Photog. Clocks movements for Equatorials

How far can meteorological results be carried by means

Reports of Cape Obs^y & Nomenclature of Stellar Stars

W. H's Character

Herschel's Character

Ch of Geneva & Empty Tomb

Natural Theology

Meteorology

Brit Ass

Bessel

TO W. MORRISON. 43.11.24

21

Photog^y applied to Astronomy.

You are by no means the first who has written to me on the subject of the application of photography to Astronomical purposes in the mode you suggest. But there are some considerations which occur naturally to every one practically conversant with the two subjects - photography and astronomy which I fear will for a long time damp any sanguine hopes of success in such an attempt. 1st. the image must be formed by means of a telescope or other optical contrivance.

Consequently that image will necessarily be loaded with all the imperfections of telescopes and optical pieces of workmanship 2nd. the telescopes applied to view the heavenly bodies are actually microscopes of as great power as it is at present possible to apply with effect to any real object. The object glass forms an image in the air - you propose to receive it on a daguerrotype plate. But this would only be to superadd the imperfections to which every photographic process is liable, to those of the object glass.

Again you propose to contemplate this photographic copy for after all it is but a copy of the image through a powerful miscroscope. The Astronomer contemplates no copy but the actual aerial image through one - and that as strong a one as under the circumstances of the obsn. he finds himself able to apply with effect. Had you ever examined a Daguerrotype plate or a Calotype picture through a powerful Microscope I am disposed to think you would not think the effect very encouraging. 3rd. the retina of the eyes is by far the most susceptible photographic recipient we ate present know of. It receives many hundred distinct pictures in a minute and from these the judgement fixes on the best or joins into one whole (rather) all the most distinct parts of innumerable individuals, each imperfect in some particulars. I believe it to be so in all vision. It certainly is so in Astronomical vision. In Astronomical observation there is no such thing as a steady contemplation. Owing to Atmospheric causes every image in every part of its contour is in a constant state of change and tremor. Granting an instantaneous photographic impression the probability is extreme that the operator would seize the wrong instant. The eye receives all and the judgement throws aside all but the distincter impressions.

I believe Daguerrotype impressions have been taken of some parts of the Moon's Surface. I have not seen any however. If taken with a low Magnifying power they would probably save a delineator a good deal of trouble in the copying of details - so also of the Solar Spots which application of the Daguerrotype or Calotype process I have myself suggested as a worthy object to be fulfilled by the equatorial instrument which at my earnest instances the Admiralty have I believe resolved to send to the Cape. But it is not for ultra-magnifying or minute scrutiny that I look for any service from the process but simply as an easy way of putting on record daily the size shape number and disposition of the spots with a view to their history which has never been fully and fairly gone into as a matter of regular observation.

Daguerr^e Plate sent to C.G.H.

1843 Nov 29. To Whewell. I have given your letter to Miss Edgeworth who with her sister (& Mr W) Mrs Wilson has been with us for a few days. She is a very charming person... Well, you breathe again after a really exciting time... We have heard from all quarters at once of the Royal affability & of the receptionary faculties of their Host & Hostess. —. I must come back to Miss Edgeworth. I do not recollect her ever so clear, acute, rich & brilliant as at present at 75! We talked of all things & of all persons except Dr R (her brother in law) What you say of that matter hits the right nail. [further extract.]

Miss Edgeworth

Visit Ass^n at Cam.

It may be that I seized more hastily on a careless eloquential blunder than I should have done - but it set my blood up - and there's an end.

We are all going on well here and I thank you for what you tell me about Pritchard. After all what Willy wants more than Latin, Greek or Algebra (of all which he has quite enough here) is Cricket, football, fighting and good fellowship and from all I hear of Pritchard I am almost afraid to ask him to take a boy for half a year as an experiment. Can you give me a hint if I can make such a proposal ?

Thanks of Mrs for Willy H.

Dec 27. 1843 [Anstice To Mr Spalding & Jenner excedingly kind but giving notice. To Berlach's relatives.]

Dec 27. 1843 to do do. A friend of ours ... who now occupies as my own tenant one of the houses into which our former residence at Slough has been divided. This lady was Mason (widow of a surgeon at Slough) filled many years (was governess to Sir Charles Barry's children)

Children's Portraits

1844 March 26 Recd. from ~~my Nephew~~ Bogueslasky etc etc Sent to my
Nephew the 3d of April. Son Alfred took leave going to Brighton.

There is, I fear, no denying it - the Cat will out of the bag - the Hexameter unvaried by the Pentameter is too heavy for the English ear which is attuned to such infinitely (and I must say delightfully) varied versification. Nevertheless I wish somebody competent to the task would give us in English a Hexameter Homer - if only as a parallel to Voss.

1844 Jan 2. [To - Milnes about Caroline H's money matters.]

1844 Jan 29 To De Morgan [About a Benefit Club. Description of Hawkhurst in those days ^] 1844 Feb 18. To de Morgan [same subject] ... but we have one or two persons here to convince who think the benefits ought to be made cheap to the poor. i.e cheap loss, cheap deception, cheap ruin!

Talk of Horses in Hexameters

Hawkhurst in 1844

cheap ruin!

Weald of Kent & Sussex Friendly Society.

1844 Mar. To A. De Morgan. ... I should have replied but I was summoned on a Special Jury to Maidstone & kept there dancing attendance 5 days. (i.e. I lost 5 whole days including going & returning which take each a full half day in the middle of it.... P.S We pay here about 11/- & 12/- weekly wages, also we have a hop harvest, a grass harvest, a wheat harvest, and a hop pole harvest in winter. We have little distress here in Lord Ashley's sense of the word. P.P.S I cannot register my letter here. Our postmaster is a dolt & lost me two foreign letters on Sunday last. I daresay he knows not how to register a letter.

Special Jury

1844 Mar 17. Mrs Somerville. [A most stimulating letter. Might be given in extenso as a model of the sort of letter H wrote to Mrs S.]

1844 Apr 3. To Argelander. I have just received your new Uranography. The work is one especially interesting to me, since I have been myself engaged in a careful survey of the whole surface of the heavens with a view to the very same object, viz. the correction of the infinitely numerous & glaring errors which exist in all the charts I am hitherto acquainted with, and the formation of a Uranography which shall be for the present time a true representation of the state of the heavens as regards the magnitudes & configuration of stars visible to the naked eye. My survey is completed but I have not yet prepared the charts for publication, nor indeed am I quite decided in what manner to publish them, or whether to do at all, since it must be a work of much expense & no return.... Should I publish my results as a Uranography, I am disposed to try rather a bold experiment i.e to reject the old constellations in toto & to divide the stars into natural groupes the best that can be made out so as to strike the eye. I should like very much to have your opinion as to the advisability of such a step.

Argelander Charts corrected

I will want to re-group the stars

Apr 3. 1844. To Longmans. ... I must consider myself as (for the present) absolutely precluded from undertaking anything until my Cape Observations are published. You are in possession of the absolute copyright of the work (Outlines of Astronomy) as it now stands. etc.

New edition of Outlines of Astron.

1844. Apr 17. Murchison. ... I feel the greatest possible difficulty in replying to your letter on the subject of the meeting of the Brit. Ass at Cambridge in the summer of 1846 ... that I should fill the chair on that occasion. ... one considerable difficulty arises from the extreme reluctance I feel to pledge myself to be at any given spot in performance of any given duty at a date nearly 2½ years from the present time. It is a pledge which can hardly fail to involve personal & domestic inconvenience ... so grave that ... I feel quite unable to give it. ...

Accepts Chair but Can't

1844 Apr 21. Murchison. (A mistake between 1845 & 1846 had been made by Murchison so H agreed to 1845 Chair.)

As regards the Brit. Assocn. If it should appear that any general desire should subsist to place me in the Chair, next year I should certainly not retreat from that mode of making myself useful so far as my ability will carry me to shew myself grateful for the reception I have met with from the Scientific world.

There is only one proviso respecting my acception to the office viz:- that my call to the Chair be so far unanimous that no man shall feel himself aggrieved or his pretensions (in all probability quite equal or higher) set aside on my account. I am far from "ambitioning" this office (though fully impressed with the honourable distinction it implies) and would more gladly see it filled now and hereafter by any other man whom the Association may deem worthy of representing it. Pray make this distinctly understood.

His Case of Stone during Sabine

1844 May 1. W.H. Smyth .... I give you joy on the finishing of your book & wish I could see daylight through some chink of mine ... everything goes slowly where one person is to do all in a work of the kind I am occupied on. .

1844 May 15 Whewell. .. Thanks .. for your kind invitation to Cambridge ... I am tied here by my work which though I cannot urge on as I wish, I at least deny myself all such indulgences till it is done. (Dawes ... took a house at Cranbrook etc)

To Humboldt

(A. v. Humboldt Briefe 1846.10)

There is only one thing I cannot so easily reconcile myself to in its perusal - that you should write in French in place of your own noble German which you admit to be more your own than the other. You do me only justice in believing me partial to the German language. English is the language of busy practical men, dense, powerful and monosyllabic - German of deep thinkers and massive intellects, binding the Protean forms of thought in the many linked chain of expression - French of vivacious talkers whose words outrun their ideas by mere volubility of organ and habit. However, write as he will, a letter from v. Humboldt can never be anything else than an intellectual feast. A mind so stored with the ideas of all ages and nations will find a richness (or create one) in any language it may use as its outlet.

Humboldt writes in French

1844 June 13. [To Headlam. About H's suggestion in 1838 of passing fumes through water & so making a valuable bye product]

Bye-product from fumes

1844 June 18. To Struve (The physical trouble of moving appears more & more in his letters)

— Poor Punch —

July 7th 1844 To Col Sabine. .... I have long felt myself in something approaching to a false position as Chairman of the Magnetic Com^tee of the Brit: Ass: having never made any magnetic observations or written otherwise than perfunctorily on any point of magnetic theory. In consequence I do not consider myself at all capable of forming a distinct independent opⁿ. opinion ... & where I cannot form such an independent opinion I cannot help feeling a very great reluctance to putting myself prominently forward as the advocate of any course of action. (re Applying to Govt. for further subsidy for the magnetic & meteorological Observatory)

Barlow ceases to be Chairman of Meteorol Com^tee of Brit Ass.

July 22 1844 (Probably an "official" letter to Sabine) ... as there appears a prospect of the Magnetic establishment becoming permanent ... I cannot undertake in future to devote to this subject that share of my time .. which I have hitherto found it to require. If the Brit Ass: shall still think a standing Committee needed, though I shall not think of withdrawing from it, yet I must be under the necessity of requesting some other member to undertake whatever correspondence may be needed. ... My scientific life draws towards its close, I have much work upon my hands & more than I can hope it will be possible for me to execute. (also family needs) .. but in addition to this I feel my health rapidly breaking & I have many & distinct warnings that what I have to do I must do quickly, that time is the stuff of which life is made.

[Official Surveys of European Countries were now in progress.]

Mrs Somerville in Rome

1844 Sept 6. ... To A. De Morgan .... Mrs Somerville will remain in London only till the 16th when she returns to Rome & has papal permission to introduce 100 books without Custom House examination & confiscation which in Italy means the same thing.

44.9.6.

TO A. De MORGAN.

What a dreadful loss that of Mr. Baily. I cannot hardly believe it real, it came so unexpected and so fearful! His place will never be supplied for he was altogether Sui generis.

1844. Sept 14. To B. Baily (on recently accepting the unexpected legacy of 7 annuities of £100 from Francis Baily.

1844 Oct 23. (To P. H. Holland about a mem^r to some one at Manchester a Chemist? ? Baily.

1844 De Morgan. ... This is to me an element of the very last importance, I presume the biographical sketch (of Baily) will not be required before the anniversary in February. ... Biography is a line of writing in which I have no experience & I have some misgivings that it is one for which I am not well fitted.

1844 (later) De Morgan .. I am reading with much care of all the chief works (of F. Baily) Flamsteed Pendulum, Density, Weights & Measures, certainly a wonderous mass of diligent & minute research & labour. - Of the 1st 30 yrs of his life I have hardly any knowledge.

1844.12.28 To De Morgan

I really don't know what can be said about my Cape obsns. at the anniversary. I work at them and hope to get them out in a year. But I cannot pledge myself to do so - for I am constantly put back in my work by other work interfering, and I have not any the smallest aid, either to add two numbers together or to copy out a page of MS. fair. However, one thing I know that never " lover for th' appointed hour" longed, as I do for the day of publication - which I trust will come in Heaven's good time. And then won't I have a lark ? that's all.

1845 Jan 12. Herbert Spencer. ... The origin & nature of the Solar Spots is a subject of such excessive difficulty that I feel myself quite unable to come to any conclusion that seems to me for a moment tenable in presence of the objections which rise up against it. Happily attention is now very strongly directed to the facts, and their forms & changes are noted with a consecutiveness which may very probably at length bring us to the threshold of a tenable theory. The difficulty which occurs to me as fatal to your theory of the precipitation of a "dense metallic vapour" (so dense as to be opake to sunlight) is the excessive tenuity which must be attributed to any gaseous or vaporous matter a few thousand miles above the solid nucleus.

had accomplished the results of my Cape Observations.

1845. Mar [Testimonial to the Crown on C. Piazzi Smyth as Regius Prof Astron Edin]

1845. 10. Mar. To Wheatle. [About this W.'s extracts from his Plurality given to Lady H.]

1845. 15 mar. To J. W. Draper. [Re extent of 's photographic knowledge in 1839 to which he does not think Draper does justice.] May 7th. 1845. So far I had written at the date with which this commences. ... & I have now little prospect of being ever able again effectively to take up the subject of photography. What I can only commend it to the zeal & penetration of observers like yourself. [After which he crosses Draper's T's for 14 lines]

Death of F. Baily

Baily - Memoir

Cape Obs^ns again (in Smyth)

What is Origin of Sun spots ?

Collision of grains by Electric shock

Letters on Photog^y

45.4.15.

1845. April 15 TO A. SEDGWICK.

The "nebular hypothesis" I believe originated with my Father and was from him taken up by Laplace. Laplace said to me one day at Arceuil "Mons. Herschel - ces idees de M. votre Pere sur la condensation des nebuleuses m'out toujours paru tres philosophiques et tres vraies."

1845. Apl 15. To A. Sedgwick [re "Vestiges" & "the appetite for the trashy"] "I am glad you are going to Review it. Don't spare!" [This letter might be boiled down.] "I hope you will show up M. Comte for this. I always suspected him to be a sciolist & now I know it. I was sorry to see Mill's book so full of him. ... Any hints as to the duties of the office of President I shall be called on to fill at Cambridge & the occasions on which he has to act and speak will greatly oblige. I shall feel very much at a loss else how to behave & perhaps give offence.

1845 May 2 To De Morgan (One Society Quelfed down by another see De M.'s letter)

1845 May 26 To a lady? ... Pray excuse horrible blotting on the other side arising from want of success in mending a pen. ... I am effectually laid up by a strange & painful affection of the chest the effect I suppose of some cold somehow taken which distresses me horribly & gives me no peace day or night. (Mrs Wisky had had scarlet-fever.)

1845 May 30. H. Lloyd. (A meeting of Magnetic Com[n] of Brit Ass to take place at Geolog: S: in Somerset Ho.) "I think it will be a great advantage to the subject if we could place your name first as really the representative of the subject of Terrestrial Magnetism both in its theoretical & practical branches in this country, as I myself have really no pretentions of the kind [He was Chairman.]

1845. June 9. To Faraday. ... connection of Light with Magnetism.

1845. June 12. To Duke of Northumberland. ... the work of reducing & publishing results of my S. Hem: obs[ns] to which your Grace has accorded so noble a protection ... the whole of the calculations .. down to the very minutest particular has been executed personally by myself. This has been necessitated, not merely by my unwillingness to entrust it to others .. but by the peculiarities of the instruments & modes of obs[n] employed, the details of whose reductions could not by any possibility have been properly gone into by a stranger, the instrumental corrections having to be determined & calculated by methods wholly different from those practised in any Observatory provided with any instruments in ordinary use .. As regards other parts of the work under similar circumstances it would have been still less possible for me to have availed myself of any assistance (part) depending on graphical projections altogether indecipherable to any stranger, & (part) on a long & intricate process approaching much more nearly to the solution of a algebraic problem than to any numerical computation & requiring an exercise of judgment at every step. [Further details showing the extreme practical difficulties of getting accurate engravings in those days.]

Laplace on Nebular Hypothesis originated in W H

Comte as Sciolist(?)

Hints for Pres Brit Ass. see Vol VII p 13

Ill health (Scarlet fever in Children)

Newton's Size:

To Faraday Light & Mag

Case of H's private meetings make it unembarrassing

July 10. 1845. To J.S. Mill. [re Comte on the nebular Hypothesis & JS Mill's 'System of Logic'. Herschel criticizes both unfavourably.] "I am not surprised that you should have been somewhat startled ...

July 16. 1845. To J.S.M. (Herschel's explanation of some of his criticisms) ... th. Comte avowedly shuns this difficulty & substitutes in place of a legitimate attack on the problem a short-cut ... etc.

July 18. 1845. To J. to Mill ... If I were less assured than I am of the inexpugnable nature of my position, I think I should feel some unwillingness that you sh^d. communicate a copy of the Comte [of JFWH's letter. July 16. 1845]

Nebular hypothesis & Comte's argument

1845. Sept 2. H.A. Jeffreys. (being asked to sign a memorial about punishments) ... I have an insuperable objection to placing myself in the position of adopting in entirety views & grounds in which I only partially coincide, or which are so expressed as to leave it doubtful to me whether if I had full time for their consideration I should coincide with them ...

Would support views on punishments

1845. Oct 5. To W. Whewell. You will think me I fear abominably negligent in not replying to your letter, calling for a reply, before, but I have for these last months been engaged in a breathless pull at double star orbits being led thereto by my old friend & Virginis & have got so interested that I have day by day taken up the subject in the morning where I left it at night to the neglect of everything else. ... I envy you [... one eldest boy continues delicate. Sc. furn.].

Parental difficulties owing to lack of continuous work.

Whewell 45.10.5

I envy you your mobility of intellect. If I let go hold on a subject for a day or two I begin to find I have all my ground to go over again. My only chance now of doing any further good in scientific or any other matter is in unbroken continuous application. But of that, a man out of Germany, seems to have very little chance of having at his command.

1845. Oct 8. Ld. Northampton. [To urging on Govt's decision re Magnetic Observatories.]

1845. Nov 2. To A v. Humboldt. Your most valued present of the 1st vol: of Kosmos was handed to me at Cambridge. ... Its perusal has delighted me. ... I have never seen a more comprehensive & masterly exposition in brief of the System of Astronomy & especially of our own planetary System. [& much more.] ... Govt. agreed to Magnetic Observatories

m.th

The period of Saturn's Satellite

1845. Nov 2. Humboldt. ... Among the planetary relations there is one which you and I believe all other writers have overlooked. It cannot be the result of accident, nor is it easy to see any object it can answer. It is this. that in the System of Saturn's Satellites the period of the 1st Sat: (the nearest to the ring) is exactly half that of the 3d & the period of the 2d exactly half that of the 4th, when I say exactly I mean to a very few seconds of time ....

Theorizing on very slender basis.

1845 Nov 2. To Mrs Somerville .... Influences widely differing from either light, heat or colour are transmitted to us from our central luminary which are mainly instrumental in evolving & mattering the splendid tints of the vegetable creation: ... I am ... going to communicate your results ... to the R.S. ... they will lead to a vast field of curious & beautiful research. .... I am here (Cottingham) nearly as much out of the full stream of scientific matters as you are at Rome.

m.th

Cottingham as "out of it"

Nov 7. 1845 [To Baron Berg of Munich re an Equat.l for C.G.H Obs.y]

1845. Nov 9. To W.H. Pepys. ... Have you any recollection of an occasion at the R.I. ... you recollect this, can you give me the date & the names of any parties present? ... My reason for this enquiry is that you ... gave me a "contact" in trial of an experiment. I had prepared (polarized light ... magneto elec: causes ray of light to revolve) Do not suppose ... I have the least desire of disturbing Mr Faraday's claim to his discovery – He who proves discovers. But I do think it something to have had [Chase this in a diary where he made a statement & drew a picture. Then write] so long ago ... something approaching to a conviction that there must exist a class of phenomena of the very same character as those which he has brought into evidence. [Answer of W.H. Pepys. Kensington 12 Nov. 1845. ... It was on the 14th Mar 1823 that we used my Magnetic Coil. There were present, Sir H. Davy, Dr Wollaston Mr Herschell, Babbage, Children, Daniel, Brande, Allen Ostade Faraday, Phillips Colby, Pepys, Birkbeck etc. I remember you were desirous of trying some experiment on Light & I think Mr Babbage rendered you some assistance but being so taken up at that time prevented me paying the attention I could have wished to you. Ever your most truly W.H. Pepys.]

1845 Nov 24 ... To A. de Morgan. ... For my own part, I get 1 thin – at least I shall do so if a horrid & indescribable annoyance in my chest ... which I suppose arises from some cold caught in London continues much longer & which destroys what's left appetite & comfort, what is worst it renders the position of writing abominably painful so no more at present ...

1845 Dec 10 To Sedgwick. ... It is to be in use (for Xmas party) for we are all resolved to try who shall be the greatest child but at present I am sore afflicted in the flesh with a horrid pain & ache in the chest & side, the effects as I am told of some derangement of the stomach, it has held me now near a month ...

1845. Some time – Dr Northampton. [re New Charter for R.S. L.d N. consulted him. His 6 reasons or views.] ... as to discussions ... I doubt whether medical discussions wd prove very edifying ....

Dec 22. 1845 To J.S. Mill [He says he has been ill for some weeks.] A criticism of J.S. Mill's Logic & JSM.'s criticism of La Place; I feel quite satisfied myself & hope to make it clear to you that Laplace is perfectly right (on a certain point)

1845 Dec 24 To Mary. (Evidence a telescope for H.M. admiralty for C.G.H.

To M. Faraday. 46 1. 22 mo

Go on and prosper – "from strength to strength" like a victor marching with spurred step to further conquests – and be assured that no voice will join more heartily in the Paeans that already begin to rise, and will speedily swell into a shout of triumph astounding even to yourself, than that of J.F.W.H. [P.S. I have taken the last mathematical advice on the subject already that is in my power.]

1846. Jan 5. To R. Hunt. ... It seems to me certain now that we have got access to the secrets of crystalline & perhaps all molecular force.

1846 Feb 20. To W.H. Smyth. ... I am considerably better .... My Book is actually in the press & I am expecting my first proofs hourly. This drives every thing else out of my head as it will be a race between the printer's devils & myself .... I saw the double Comet and a real downright marvel it is & no mistake. To say the truth I never have been so amazed by any phenomenon I have ever witnessed. What is it going to turn to? Nous verrons.

1846. Apl ? To J.S. Mill. Problem A. .... same result as La Place's. (A draft.)

1846. Apl 2. To J.S. Mill. (Resuming the charge re Laplace.)

1846. Apl 3. To J.S.M. (Enclosing the workings of Laplace's problems) It seems to me that so presented their evidence is irresistible & I doubt not that you will perceive it to be so.

1846 May 17. To Whewell ... I see you have Chapters on the Relation of Church & State & on International Law, both subjects of deep interest & about which I shall be very glad to see what you have to say as on both subjects I have not yet quite made up my faggot of opinions — a confession by the bye. I would not make to every body. ...

1846. June ? To Whewell (a draft) ... (on his Principle of Morals). ... The general sense of mankind has been that Lawgiving is the proper work of mature age & instructed experience, rather than of youthful & inexperienced feeling & impulse. The very names Senators, Gerontes etc shew this ...

1846 June 27 To J. MacCullagh ... I have just read your most remarkable paper on the dynamical theory of Crystallinic reflexion & refraction. .... I fear that my long desire of the abstruser mathematics will always be a reason why I shall see these things through a glass darkly. ...

1846. July 8. To Sabine (draft) (re Programme for Brit: Ass next Meeting (Spkrs) & re the notion in the air of one great Central Institute to combine all the existing Scientific Bodies. — [I thought a union of libraries might be good, but otherwise confess myself behind the times as to the advance of the age.] ... I hope I shall meet you at the Ld Mayor's Dinner on Friday. ...

1846 July 23 To De Morgan (re Photog?) ... then fix with hyposulphite of Soda, the only fixing material that can be depended on for Argentine photographs. ...

1846 Aug 3. To Waterston (a draft. Not sent. However, it expresses H's views) .. I confess, I entertain little hope of the success of any simple mechanical explanation of the phenomena of heat, Electricity, magnetism etc ..... (Waterston evidently had some scheme of reading a Paper before the Brit Ass:)

1846 Sep 2. To Murchison. I re-enclose your paragraph about Faraday. ... .. Faraday is & has always been much more than a mere Chemist. He is a Physicist in a very wide sense, though not a mathematical one. His developements of the relations of Electricity, Magnetism & Heat, of the mechanism of Gaseous condensation & many other of his lines of enquiry all lie deeper than the mere manipulations of Chemists, such as are yet held to be good & even most distinguished ones. I mean analyses of compounds, and processes of products, speculations on atomic constitutions etc. It is with the intimate & recondite forces of Nature that he deals. (Here, as Owen's follows much of interest. To be copied.) ... Faraday's discoveries are the direct lineal descendants Oersted's, who must feel a Patriarchal pride in seeing the consequences of his own youthful idea every day ramifying out wider & wider & spreading over every part of Science. ... I, by no means feel competent to say any thing very distinct & pregnant on Faraday's recent discoveries. I have never seen any thing of his diamagnetical experiments (not for want of opportunities offered but for want of ability to make them the object of a 2 days absence from home). In a general way I feel their immense importance; and the consummate skill with which they have been worked out & phenomenon educed from phenomenon by that mixture of experimental dexterity & physical divination which I think characterizes F. beyond all his predecessors in his same line, is above all praise. His magnetization of Light I do not consider to be such, and I think he did his own views harm, by calling it so [It was precisely because I aimed at a magnetization of Light and not of Media traversed by light that my own experiment in 1823 of passing a polarized ray along the axis of a magnetized Helix failed to afford any result. I, by no means wish this to be alluded to at the meeting.] ...

1846 Sep 2. To Whewell ... We have been this summer, more than ever, visited by immense smoke drifts which are said to arise from peat & turf, burning on the Essex coast; we had 3 days of it in June & 2 or 3 more in the last month.

1846. Sep 13. To Lassell ... Your observations of the 7th Satellite appear ... to satisfy ... as to the real existence ... & that it is a satellite. [Saturn?]

Confession to Whewell of Selection Scarcities

Baye's memoir to be read (Brewster)

Photography

Heat, Electricity, Magnetism not to be easily explained

Observations on Faraday's discoveries

To Murchison Sep 2/46 cont

Oersted & Faraday

Satellites of Saturn

46.9.14. Give me leave to state that in compliance with what I consider an imperative Social duty I have ceased of late to take in every Scientific Magazine or Literary periodical. The last, which I gave orders to discontinue, some months ago, was the Annalen of Poggendorff. I will not deny that I feel this to be a serious privation to a man of my habits, but I prefer it to a breach of the duty to which I have alluded.

L. Howard 46.9.14

You will of course perceive that the mention of these circumstances on my part necessitates no reply on yours and that it is to be considered as confidential.

1846. Sep 26. To Mr Roberts (Engineer Manchester, ... Your object being to make a reflector 10, 12 or 15 f. in diameter! I cannot avoid saying that if you wish for success you must begin at the beginning & work your way upwards to the larger. By this means you will learn practically the nature of the material you have to deal with. .... The enormous aberrations of the Herschelian construction might be avoided without etc ... The question immediately arises how when & by whom it is to be ... used; nothing short of a great National Establishment could suffice.

1846 Oct 18. ... I ought to observe however that the chief objection to the Gregorian form of telescope arises from its excessive smallness of its field of view ... the same objection would hold good in the Cassegrainian construction. [and a long letter of detailed & practical advice on designing & telescopes & making reflectors.]

.....

(to Neptune) To Whewell [Extract from letter of "The Walk"... Post? 46.11.6 tendency]

I mourn over the loss to England and to Cambridge of a discovery which ought to have been theirs every inch of it, but I have said enough about it to get heartily abused in France, and I don't want to get hated in England for saying more. Only if you have any influence with Challis for heaven's sake exert it to prevent his writing more about it in the papers - or elsewhere. His letter to Arago (which I see in the Guardian) and indeed his last letter to the Guardian were to say the least of them quite superfluous. He did all he could do when he stated in his first letters to the Athenaeum simply what he had observed and he stated it well, clearly, and candidly. If anything could compromise Adam's case it would be such letters as those I now speak of and that his letter to Arago has done so to a certain extent in France is I fear only too evident. P.S. The Royal have voted the Copley Medal to Leverrier. I did what I could to assist it (though it could not have been otherwise) and wrote to Arago informing him I had done so. Leverrier's claims cannot be superseded or impeached, but we must not bungle ours to a large share of honour and now that the first effervescence is subsided the matter will come to be recorded with all historical formality. [Pencil Note by Wh. not sent: After all it is now quite clear Adams was the prior discoverer]

46.11.6.

TO W. WHEWELL.

(Pencil Note - "After all it is now quite clear Adams was the prior discoverer". sic Not sent)

1846. Nov 11. To Secr. Committee Physics R.S. (Thinks it better to write an opinion than talk.)

46.11.25.

TO NORTHAMPTON

My dear Lord Northampton,

Mons. Leverrier has written to me to request that I will act as his representative on the 30th to receive at your Lordships hands the Copley Medal. With your permission I shall make a point of doing so and shall attend in my place accordingly. I am very glad, I must confess, that he has fallen upon so decisive a mode of shewing that no vestige of the little mal-entendu which prevailed at first between us on the subject of Mr. Adams calculations, remains on his mind - and that, in consequence,

46.11.25..43.

To L^d Northampton.

those calculations can now be fully spoken of as matters of history without thereby necessarily wounding or appearing to wound any feeling on the other side of the channel.

Sec 4. 1846 To De Morgan. In deals of Bessel's Hs allusion to him at annual R.A.S. 46.12.22.

TO W.H. SMYTH. P.R.A.S

Au reste I must repeat what I said at parting that (barring its resulting in disunion among ourselves) I should see no harm in Medallizing Adams -- provided it were done in such a way as to secure to Leverrier his intact glory and award him the more prominent distinction. But if it have the effect - and above all if it draw down a protest from yourself as President, if carried - I should think it an evil inasmuch as I think A. stands in quite as good a position without a Medal as with one.

46.12.24.

TO A. De MORGAN. (re Neptune)

Schumacher writes to me in a quandary about the name of the Planet. He says "oppositions are rising up on all sides" - I suppose the Germans don't quite digest Arago's trenchant way of dealing with it and that they won't adopt any but a mythological name. - (and I confess the same nomenclatural creed). The Planet Shuemacher (if it had been discovered by our good friend) or Sheepshanks - would sound odd. I don't know how "Leverrier" sounds to French ears but to my mind it is not unlike "glazier" in plain English.

As he asked me what name I liked I offered him Hyperion (ὑπερ ἐων) The Transcender) who was by the bye a son of Uranus and Terra - if Minerva wouldn't take his fancy which I confess it does mine. I wish it was named and done with or the Astronoml. will get into some confounded scrape about it.

46.12.27.

TO W. STRUVE.

The discovery of the new Planet is indeed in every way a most spirit-stirring event. Doubtless, as you remark, had your Review extended so far South you would hardly have failed to have detected it by its disc. I had myself a narrow escape of it. On the night of July 14th. 1830, I swept over the zone 108°..111° N.P.D. and I find in that zone objects as low as 111° 12'. In particular a double star No. 2875 of my 5th. Catalogue at $19^h\ 22^m$ 111° 12'. Now as nearly as I can calculate from the present elements the planet must have stood on that night about $19^h\ 28^m$, 111° 40'. Had the zone gone half a degree lower I do

To Struve unP. 46.12.27..44.

not think I could have missed it in the then state of the Atmosphere, sonce on that very night at $20^{o}47^{m}$ Uranus came unexpectedly into the field which I mistook for 19 Capricorni (having no idea of Uranus in my mind) and immediately set it down as a beautiful Planetary nebula, with much surprise that such a conspicuous disc could have escaped notice in a well known star. I think therefore that had the new Stranger presented himself in the field it would have shared the same fate.

But it is better as it is. I should be sorry it had been detected by any accident or merely by its aspect. As it is, it is a noble triumph for Science. .... I perfectly agree with you, there are still planets beyond, ... In my Cape Observations .. in my enumeration (of nearly 70,000 stars in 2,300 fields of view)!!!! Mr Lassell of Liverpool who has mounted a 24 in Newtonian reflector of 20 ft focal length .. suspects a ring or Satellite to Leverrier's Planet. ... Mr Lassell has also succeeded as he writes me word ... in verifying the existence of a 3rd Satellite of Uranus. However as he has not yet publicly announced these results we must receive the notice as at present not absolute. Does it ever

Did it ever occur to you that a small distant Satellite of Jupiter might have escaped detection. I mean one like the distant Satellite of Saturn very far beyond the others - simply from never having been looked for ? If I had a telescope mounted I should certainly make it a subject of enquiry.

46.12.29.

TO W. WHEWELL.

My dear Whewell,

I hope you will pardon if I say that your statement if correctly reported in the Cambridge paper that the discovery of the New Planet was due to Mr. Adam's researches - appears to me too strong for the occasion.

Had not Leverrier's announcement of his results appeared I think it by no means improbable that Challis might actually never have turned a telescope to the heavens in search of it at all. This I think is no unnatural conclusion from Airy's words "I am authorized by Prof: Challis in oral conversation to state that the same expression of mine" (viz:- that L.V. has announced a place agreeing with Adams and that the Planet ought to be sought for) "induced him to contemplate the search for the suspected planet."

Neither am I much more confident that without Leverrier's Annonce, or at least without some more decided move on Adam's part Airy would ever have recommended Challis or anybody else to look for it, or offered an assistant for the purpose.

To be sure, in progress of time, Adams might have continued to work at his theory and elaborated it to a high degree of refinement - might have satisfied Airy's scruples about the

radius vector - or he might have published it himself as it stood - or sent his elements to a newspaper - or to the Astronomical Society - in which case somebody else - some Amateur - might, and most likely would, have thought it worth while to look into the place indicated &c., But none of these things were done and no telescope was ever turned to the sky till the publication of Leverrier's results forced it to be done.

On the other hand Galle looked for and found it on the sole ground of Leverrier's place, while Challis cannot shew that he looked for it (when at last he did so) purely and simply by Adams's. When he began to look he had already a knowledge of Leverriers results, and he did not find it till after Galle had done so - for I do not call finding an individual object merely including it in a crowd of others (without knowing that it is there, and rather suspecting it not to be) with an intention of examining them at leisure to ascertain if it be among them or not. Nobody but Sheepshanks will ever say that C found it before G.

Until the planet was actually seen and shewn to be a planet - there was no discovery - except in so far as a successful physical hypothesis is one. Certain motions have to be accounted for. A and B unknown to each other frame an hypothesis to account for it as do also C.D.E.F. and all these hypothesis are one and the same as the most natural and likely to offer itself - C.D.E.F. however though prior to A.B., in time, do not pursue the hypothesis into consequences - A does - earlier than B - B does subsequently to A but more thoroughly - goes more into detail - finds its satisfy all minutiae. Assuredly A has gone a certain way to establish the hypothesis. Many may have been induced by him to believe it true - many more by B's enquiries. But before it can be received as an established hypothesis and called a discovery there is yet a step - it has to be tried whether other rival hypotheses will not do as well or better - till this has been done - till mens minds are made up to call the "theory" a "fact" there is no discovery. The sight of the actual thing of course forces them to do at once.

Such then is my view of A's claims independent of the visible recognition of the planet. The original hypothesis was neither A's nor B's - that is communis juris. A's establishment of the hypothesis was earlier but incomplete. B's later in time but more complete; in fact so complete as to leave nothing worth disputing about ti be accounted for in the observed phaenomenon - A satisfied the longitude and it is presumable enough might or would have satisfied the radius vector - he explained half the phaenomenon - he probably could and almost certainly, had time been allowed, would have satisfied the other half. B satisfied both halves.

I should not write this but that your weight is so great and your opinion goes so far to impress the world that I hold it of great importance that you should not finally pledge yourself to so strong a declaration till after looking at it in various lights - and perhaps it may not have occurred to you in that in which I have endeavoured to put it. ....
P.S. May I suggest a regular and systematic registry either by photography or careful depiction of the solar spots as a very worthy object for a private observatory in want of work. I want to see an unbroken history of the Sun's face and unless this be done in several places bad weather will make lacunae.

46. . .

TO R. JONES. (April 21: 1847).

I have seldom seen anything that has more thoroughly disgusted me than the article in the Mechanics Magazine. It is a broad charge against Airy of the blackest treachery and baseness. It would be a shame to call upon him to answer such a charge for which there is not a shadow of foundation save in the low and defiled imagination of the writer. I by no means approve of Airy's conduct in some points of the affair (this entre nous) but of such deliberate rascality he is no more capable than you or I. The man who is capable of inventing such a charge would (perhaps) be capable of such conduct. Then as to Leverrier - it is a disgrace to the English press to accuse him as this writer does. Leverrier's book as well as Adams's are both before the world, and no mortal can look at Leverrier's memoirs without seeing that they form a perfectly connected and consecutive train of research and that he had no occasion at all to borrow beg or steal from anybody. Comparisons are odious. Adams's Memoir is very admirable. He has taken a perfectly legitimate straightforward way of getting at his equations of condition (at first I was not quite satisfied about this - but I see all is quite as it should be) and his combinations are exceedingly skilful and masterly. On the other hand so are also Leverrier's, and he takes a wider sweep in the whole conduct of his work. He goes into the question by clearing the ground ab initio by a preliminary total reconstruction of the theory of Uranus - a total reformation of the tables - a total re-reduction of all the observations - a total re-calculation of all the places (300 in No.) and a

comparison of them with (not Barnardo old tables but) his own new theory. Hence he concludes positively and on sure grounds that the anomalous perturbations of Uranus are no illusion no mistakes of calculation but a reality. So much for Uranus.

His conduct of the enquiry into the new Planet is quite equal in skill and power to the forerunning memoirs. But he goes into it in a way totally different from Adams both in respect of the formation of his equations and his way of combining them - and he varies his combinations so as to afford limits without which the mass and actual place of the Planet must be comprised in a way which so far as I see Adams does not attempt.

One thing anyhow seems to me quite certain - that the writer of the Article in the M. is incapable of understanding the merits either of the man he holds up as a thief or of him from whom he says he stole the goods "only gives one element and that the least recondite of the whole"!! viz:- the heliocentric longitude! Why that one element is from the way in which it is involved in the equations the Key to all the rest - it is the primary object of calculation both with Leverrier and Adams - that knowmall the others follow of course and having got that both L. and A. immediately derived all the rest from it.

And again about assuming the distance by Bode's Law (falsely so called). It is Voirons). If the distance be notassumed the problem becomes utterly intangible by reason of the excessively complicated and transcendental form in which that element enters. As the distance must be assumed common sense would direct anybody to assume one in analogy to the observed law of planetary distances, and then go on correcting his hypothesis by trial.

So ignorant is this man of his subject that he actually calls it "the new Planet Astraea" not knowing that Astraea is another new Planet having nothing to do with the matter.

I groan in spirit when I see the press used in such a way and I predict an ostracism of all eminence in the abstruser Sciences if it go on so much longer.

It is a shame to make rivals and competitors of two men who ought to be sworn brothers. Adams has the acknowledged priority in point of time that nothing can shake but till the Planet was found it was only a physical hypothesis upon trial, and no one can truly deny also that Leverrier shot fair, and brought down the bird. Now my view of the matter is that there is quite bird enough for both and if Adams is not to be praised because he is an Englishman! Why is Leverrier to be blackguarded because he is a Frenchman ? Who made one and all of the formulae by which both have grappled the planet but Frenchmen ? Barring Newton's Law of gravity (who never meddled with the planetary perturbations). What Englishman ever furnished the smallest tittle of a tool towards rigging out a man for such a struggle? It is all French "de fond en comble" Clairant, D'alembert, Laplace, Lagrange, and more recently Poisson and Pontecoulant for the analysis and Bouvard for the tables which though not quite correct were yet correct enough to raise the hue and cry. The new Planet is as much Laplace's as it is either Leverrier's or Adam's.

Mercy on us. What an out pouring!
Ever yours truly,
(Signed) J.F.W. Herschel.

1847. Jan 8 To Dr Morgan ... I see Capt Ross has applied to the P. & C. Ast Soc to back a project for a Polar Exped: under his command. It strikes me it will be quite time enough for the A.S. to take the matter into consideration when (if ever) it comes referred to them from their Lordships of the Admiralty.

1847. Jan 28. To Morgan. .. I shall in a few days send you wife what I have mustered up about Bessel. I will try & make it legible as I cannot come up to read it myself. In fact as soon as it is done I must set to again on my last chapter, of which ... I have not touched a line for a fortnight.

47.2.3

To Dr Morgan

There is a passage in P.10. marked by II · -II which there may be some objection against as Schumacher does not wish any allusion to be made to the fact that at one period Bessel thought the Perturbations of Uranus might be accounted for by specific attraction and wrote a paper about it. I have steered clear of all mention of such a paper or such an idea, but yet if you think it better that the consequences of a "Specific Attn" as to Planetary perturbation should not be touched on at all, it will be better to strike out the passage.

Believe me, &c.,
(Signed) J.F.W.H.

P.S. On 2nd thoughts I have considered it best to strike out definitively the passage in question.

1847 Feb 7. W.H. Smyth (Sec. Pres. RAS) ... I have just rec'd a note from our friend Fitton ... on the subject of the non-award of a Medal to Leverrier. And as Dr F. does not put himself forward in such matters lightly I cannot doubt ... that the feeling to which he alludes is really both strong & general ... I was myself very much surprised at the conclusion come to. I certainly have a decided opinion that not to Medallize Lev. is to do an injustice which the Society can no way get over because it is one of its own making and I feel now fully prepared from as careful a perusal of A's paper as I ever expect to be able to give it to advocate his claim to a Medal also not as a competition, not as a claimant of priority but as a most skilful mathematician.

1847 Feb 22 To A. De Morgan. ... The Medal Question ... is productive of very great dissatisfaction among the body of the Society & indeed generally among the Scientific world. This regretable state of things is felt to be awkward in the extreme, more than awkward, actually unjust to one party, in the opinion of many, to both. ... The actual state of the subject is an uncontemplated result ... disapproved by all present. I think

I trust there will be held no offence in the suggestion which I have thought it necessary to make to the President to endeavour to procure (however late) a reconsideration of the Subject in council with a view to seeing whether some more positive conclusion cannot be arrived at.

My own opinion on the subject now that I have had time to consider the spirit of the method followed by Mr. Adams in his solutions of the problem, is that two medals ought to be given; but that in doing so great care should be taken in wording the awards, to avoid placing the nations in rivalry or the parties in competition.

Though I have marked this Private, yet I send copies of it, to such members of the Council as I am in most frequent communication with and I can have no objection to its being shewn to any member of the Council. I may as well add also that if once the ice is broken for more than one medal it does seem a pity to pass over Henecke.

TO FITTON. 47.2.20

In the first place many thanks for your account of what passed. I am no partizan in this matter. And I do grieve to see two men who ought to be sworn brothers thus placed by the violent action of the public mind, in a position of competitorship with each other, while there is glory enough for both. Of course by this time I have formed my own opinion of what is right under all the circumstances of the case, in so far as the intention and utility of the Medals is concerned, which appears to me the whole gist of the matter.x (x Not quite the whole, see P.S. 3.) As to trying any question between parties about priority of publication or conception - or between other parties as to propriety or impropriety of their conduct during the progress of the affair, it certainly does appear to me that in the Astronomical Society the trial is coram non judice and that all shall do well to keep out of it.

I hardly wish to be drawn into arguing the question of the Medals, as if I were to do so with all my friends who have written to me on the subject I really should be unequal to the mass of writing. I think however that now, under all the circumstances it will be the right course to give two Medals, making however such a distinction in the terms of the award as shall secure to Leverrier the intact possession of the first honours of the achievement (upon the ground that he shot fair and brought down his bird) while at the same time every possible justice shall be done, that words can do to Adams's merit. This I think perfectly possible and I have not a doubt that with resolutions properly worded (if the New Council can be brought to agree to them) the most sensitive feelings on the French side would not be justified in feeling irritated.

With the Copley Medal in the Royal the case was different. Adams's calculations were not before the world. It might be a doubt - it was a doubt with me - whether he had not come to his result by some shortcuts throwing aside all coarse quantities by some English rule of thumb method, right in the main but neglecting much that might be influential and coming to a right result by a mixture of shrewdness and good luck. Of this notion his paper, now that I have had time to see as much of its spirit as I expect ever to do, has disabused me of this idea. I think it is sound and skilful to an admirable degree. But at that

To Hilton

47.2.20..21A.

time such was my impression. I had no ground for supposing him to have that degree of merit as a Geometer which, in the presence of Leverrier, could entitle him to a Medal. I could not attend the Committee of Physics, where the Medals are proposed, but I thought it incumbent on me to write to the Foreign Secretary before the meeting of the Council to award the Medals, declaring my hearty concurrence in the Committee's recommendation. And this letter I presume he read at the Council. This is all the share I can be said to have had in the proposal of the Copley Medal to Leverrier. If it were to do again I would do the same under the same circumstances.

I am not quite sure that I fully understand all your argument on the point of publication. But it is clear to me you have a decided opinion on the point that Adams's communication to Airy and Challis were not such. It is also clear to me that the opinions of all are not in coincidence with your own on this point. But all I have to say on the point is that I protest against the Astronomical Society being held competent to decide that question without appeal and that the fewer questions open to appeal it presumes to decide the better for its credit. If it be attempted to make the matter depend on priority of publication, it will be necessary 1st to establish a technical definition of what is published against which, be it what it will, the common sense of mankind will revolt, as it does against all legal definitions, and 2ndly to ignore the other and larger grounds of the encouragement and reward of merit and of benefit conferred on Science.

It is the correctness of the mathematical conduct and the perfect independence of Adams's researches and not theirpriority which in my opinion constitute his claim to a reward, expressive of our gratitude to him as Astronomers. As a competitor to Leverrier I never will consent to regard him. But I think it is precisely one of the finest, most interesting and most valuable points in this discovery that it can be satisfactorily shown by evidence that whether published or not the same result had been arrived at independently by two different Geometers both starting from the ordinary recognized formulae of the planetary perturbations. It is an infinitely greater face - infinitely more creditable to the state of science, infinitely more illustrative of the reality of its grasp on the planetary theory that two should have done this than one only. I am not aware that this view of the subject has been taken but I pray you to give it your serious consideration. Though after all, I do not gather that you are adverse to giving a Medal to Adams.

When I sat down I did not intend to have said my say half so fully - and pray recollect that I am not writing in my new character as President A.S., but in a much older character - and in that character pray forgive me if I say that I felt grieved by your reference to the atrocious charge brought against Airy and Leverrier in the Mec: Mag: as simply "unjust". Pray

see p. 32.

47.2.20..22A.

Fitton.

read the article again and you will see that the charge is of the basest and most deliberate treachery on A's part and the most scoundrelly conduct on that of L.V. and then ask your own warm heart and high feelings of honour whether such a charge so brought against men of hitherto unblemished characters and on no better grounds than the writer's bare suspicion does not deserve some stronger term of reprobation than unjust? ("Can it be imagined" says he "that the Astr: R: did not!! ... do so and so.") I was asked to draw Airy's attention to this abominable attack as one which he ought to answer. I would as soon have sent him a dose of poison.

But do not suppose though I speak in warm terms of this matter, that I am a partisan in respect of any fair animadversions which may be made on anybody in respect of what should have been done or omitted to be done. Perhaps if placed in the situations of certain parties I might have acted otherwise than they did - but perhaps too I might not. It is easy to blame when all is past. It is wonderful what a light the event throws on much that seemed obscure during the progress of transactions to the actors themselves and how clearly when this vivid light is thrown into the paths where men have had to grope out their way, they are led to see the turning they might have taken but missed, and at all events how very clearly the sum total of human eyesight so aided sees it for them. However on this subject I shall say no more and I trust you will not take in ill part my having said so much.

P.S. Sunday Feb. 21. I have recd. by this morning's Post the Mec: Mag: It is the 3rd copy which has been sent me! These are the attacks which harden men and render them callous, which strike at the root of public virtue by diminishing respect for public opinion and calling up a misanthropic contempt for mankind. I am sure it has not struck you in this light and equally sure that when you read it a second time you will look upon it with entire abhorrence. Again forgive my recurring to the subject. I reckoned on this reaching you before you sent off the pamphlet.

P.S. In one part of your note, you have underlined the words, "goes to the Continent." Are you not aware that A. went to Wiesbaden on account of his health which had suffered severely from over work?

1847. Feb 20 Sabine. (Drawing attention to palpable oversight in the construction of the actinometers used for the Meteorological Obs^rs. No provision for registering temperature of liquids in the Cylinders. Fundamentally alters all calculations.) ... I have come to the conclusion to sacrifice without hesitation if necessary (at least to suspend for the present) all my own work (no trifling mass of labour, I assure you). But alas! for the expenditure of much valuable time. ... I have still hopes however that ... I may yet be able to rescue some valuable conclusions. Meanwhile the one thing is to procure the suspension of the observations at present till the necessary alterations in the instruments can be made.

1847. Feb 20. To Fitton. [About the giving of R.A.S. medals to Adams & Leverrier.] [This letter should be copied in extenso.] Reply to article in Mec: Mag:

Carlin extract here

1847. Mar 1. To J.D. Forbes. (reporting "palpable oversight" in the theory of the Actinometer / 2nd letter. ? copy most of it?) (Did J.F. W.H design the scheme himself alone?)

47.3.2.

TO W.H. SMYTH.

I have taken an opportunity to ask Lord Northampton's advice on the best mode of precedure in a matter about which I spoke to you some while back - a pension from Govt. to our friend Maclear. L^d. N. adviser, me to write to Lord J. Russell. ... I think it would add materially to the probability of success if I could enclose ... short letters from yourself etc in support... You ... might then state what you know ... as to the prospects he gave up in his own profession to go to the Cape....

1847 Mar 9. W.H. Smyth. *. I have been debating the question whether or not to request you to take the Chair on Friday for me. [more, showing that if he cd. he would not sit in the Chair for a ticklish debate.] m. 7 W.H.

I have considerable hopes from what yourself and De Morgan, and Galloway also whom I saw on my return from Cambridge, said and from what Sheepshanks says in a note - that the affair may, after all, not be pressed on the Council. If it should it strikes me as the way in which I can be most useful to the Socy. will be in placing the result whatever it may be in an amicable and pacifying light - as one who has rather been a bystander than an Actor in the matter and can therefore say his say with less offence to both parties - (albeit he may take that opportunity to liberate his own soul in the matter as occasion shall dictate).

1847 Mar 12. To J.P. Muirhead. .. my best thanks for your interesting work of "The Correspondence of the late J. Watt" * ... on account of my deep respect & veneration for that admirable character whom, as a youth I well remember looking up to with a sentiment of awful admiration & affectionate attachment. .... considering the deep interest of the subject to myself as one honoured while young with the kind notice of such a man as Mr Watt.

Quote also about "confusion of mind".

TO C.R. WELD. 47.3.13.

In reply to your queries respecting the 40 feet reflecting telescope constructed by my Father I have to state 1st. that King George III munificently defrayed the entire cost of that instrument (including of course all preparatory cost in the nature of construction of tools and apparatus for casting, grinding, and figuring the reflectors, of which two were constructed) - at a total cost of £4,000. 2ndly. the woodwork of the telescope being so decayed as to be dangerous, in the year 1839 I pulled it down (the operation commenced on Dec. 5.) and having cleared away the framework &c., piers were erected on which the tube was placed - that being of iron and so well preserved that, although not more than 1/20 inch thick, when in the horizontal position that is sustained within it all my family - and continues to sustain enclosed within it, to this day, not only the heavier of two reflectors but also all the more important portions of the machinery such as being of Iron and brass stood in fear of decay as well as all such portions of the polishing apparatus as would go into it to the amount. I presume of a great many tons, which had when I last saw it produced no signs of weakness or sagging down.

(C.R.Wells). 47. 3. 13.
This great strength and resistance to decay is to be attributed to the peculiar principle of its internal structure which is in effect very similar to that for which in later times a patent has been taken out under the name of Corrugated Iron roofing &c., but of which the idea was, I have every reason to believe original with my Father at the time of its construction - as was, I am disposed to think also the system of triangular arrangement adopted in the woodwork being a perfect system of "diagonal bracing" or rather that principle to which the "diagonal bracing" owes its strength.

Ha! built up in stones → The other mirror and the rest of the polishing apparatus are on the premises but in a situation adapted only for preservation and neither for use nor for inspection. The iron grinding tools and bed of the polishers are placed underneath the tube let into the ground and level with the surface of the gravelled area in which it stands.

47.3.17. W.H Smyth.
The only mention I have heard of Whewell's motion is direct from Fitton who in a note dated Feb. 17. says "The Master of T. moved that the Bye laws be suspended for the purpose of giving 2 Medals one to Lev. another to Adams. This also was rejected and very soon after the Master left the room perhaps to dress for dinner for it was now late.

On the other hand Mr. Dawes told Lady H. that W. made a speech in which he advocated certain views which appeared to him to approach very near to what Airy subsequently moved, but that as he began to deviate from his subject you addressed some words to him on which he bowed and sate down, and soon after left the room. Such at least is her recollection of what Mr. D. described. If you think it worth while I will write and ask Mr. Dawes whether this is a correct representation of his "impressions".

To W.H.S. 47.4.?
I don't expect much from a plan for galvanic illumination of wires - i.e. if red heat be intended - (and if not I can hardly conceive how it is to be accomplished) - as I don't see how the straitness of the wires can be preserved - but it is always right to suspend judgment on what one knows nothing about.

[illegible] W.H.Smyth ... The name of the new planet ... if I had the naming of it, I should have proposed in the first instance Minerva ... then Hyperion, who was the offspring of Uranus & Terra, which would have given us a pretty name & a fair enough mythological allusion to the discovery by the inhabitants of Terra through the intervention of Uranus.

1847. Mar 23. To J.P. Muirhead F.R.S.E. On Cavendish & Phlogiston & discovery of compos. of water.
[This letter shd. be copied in extenso I

47.5.4.

TO W.S. STRATFORD.

As regards Uranus I have for a long time used that name and intend to do so. Of course I cannot possibly object to its being used in the N.A. or in any other publication. I thought I had expressed as much at the time of the "Reform" of the Nautical Almanac.

My full impression that the name Uranus has taken too deep a root to be displaced.

As to the name of the new Planet as Adams acquiesces in Neptune - as Neptune is a name of French origin (which I think very important) and as it is a mythological name, I give it my adhesion to it as an admirable mezzo-termine to avoid bringing its two discoverers into needless opposition.

I say I consider it as very important that the name Neptune is of French origin (and also that it had at one time the acquiescence if not the implied sanction of Leverrier himself) I regard the discovery whether made by Leverrier or Adams or both as in the of French origin. The Analytical theory of the Planetary Perturbation which alone render it possible is almost exclusively French. Clairant, Laplace, Lagrange, Pontecoulant and Poisson are the authors of those formulae which, used as tools or as telescopes of the intellect have done the thing and we owe them this national recognition.

As a mere name I should have better liked 1st. Minerva as having sprung fully armed from the brain of Jupiter - or 2ndly. Hyperion (the transcender) the offspring of Uranus and Terra the inhabitants of Terra having come to its knowledge by means of Uranus.

I observe that Arago calls the new Planet not "Lev" but "Planete de Lev". These are his final and formal words "Je prends l'engagement de ne jamais appeter le nouvel planete que du nom de Planète de Leverrier". Now this is rather a description than a name those who think it "Lev's Planet", may yet call it Neptune without compromise and may also if they like speak of it as Lev's P.

1847 May... To J Forbes: Your paper ... the results amount to a first-rate discovery in the integral calculus.

47.6.22. from Joanna Baillie

I cannot conceive how it can have been possible to make out any connexion between any Astronomical observations of mine and any dostrine High or Low about the Trinity. The only doctrine the contemplation of the Stars has ever impressed on mymind is that of the Power Wisdom and Goodness of God manifested on a scale of stupendous grandeur, and the insignificance of Man in every respect except in those moral and intellectual attributes which render him capable of contemplating these Manifestations and worthy to do so which he is not of himself alive, and only by God's grace and favour. I am really almost curious to know what can have been the observations you allude to and what expressions of mine verbal or printed can have given rise to such an idea.

But I remember at the Cape hearing from a friend up the Country that a report had got about among the Dutch farmers nay, had been preached from the pulpit that "the very place where naughty people go" was assuming a reality for that I had seen it in my telescope - a thing which surprised me not a little at the time, but which afterwards I thought I could trace to the fact that I had seen a star (which anybody may see if they turn a long telescope on B. Crucis - it being in the field of view with that Star) as red as blood - or as red as fire - which you will.

So pray do not let anything you hear of me in the least disturb you on the score you speak of. I am content to receive matters of faith above my comprehension with a quiet mind being well convinced that the best exercise of faith lies in reposing with confidence on what we do understand - on the goodness and promises of God revealed to us in language which there is no mistaking both in Scripture and in Nature.

1847 June 18. To Bp Stanley of Norwich ..... Having been requested by the Authorities of the S.A College of Cape T.. to select a proper person (as Professor).. I have no hesitation in giving Mr Dale (bearer of this) an introduction to yourself. ... In the interim I have recommended him to visit the Dutch Universities of Utrecht Leyden etc, which .. will be of material advantage .. among the Dutch Population of Cape Town (where) the Institution ... is less popular among that portion of the inhabitants than is desirable. .. I observe with regret that the passage out of the new Professor will not be furnished ... it appears but common justice that the Salary itself should commence at least from the date of his departure from England...

1847 June 30. To Peacock ... anticipating such a communication (i.e a formal letter from the Sec. Brit: Ass:), I could hardly reply to it in extenso without writing something like an autobiography, which my soul abhors.

To Sawyer 47. 7. 2

My better half is very urgent that I should go up to Cambridge to present my book to the Queen and Prince - as an old Cantab. and as the book itself owes its appearance as a book to the late Chancellor. The thing is badly printed & worse bound. If the Bookbinder keeps his word & I can get put in the right way (as I expect) to the Royal Presence. In your capacity of Secretary to H.R.H you will in all probability be able to give me some hint of when & where it will be necessary to attend so far as he is concerned, & so don't be surprised if I should break in upon you ... for a few minutes on Monday Evening just to get an inkling of the kind of arrangements that are going on in respect of receptions (if any.)

1847 Aug 14 To J.R. Hind. ... The plot thickens & it is evident that we are fairing out a "ring" of planets like that which has been speculated on to account for the periodic meteors. The man who shall identify one of the latter in two successive revolutions will win a crown of glory. ... Pray give

Pray give it a female name. The sisterly groupe is very pretty and pleasing. Astraea and Hebe are delicately imagined. Might I venture to suggest Iris as a name for your consideration.

47.8. .

TO W. LASSELL.

I had by me for years a prism by Fraunhofer constructed expressly for converting my 20 feet reflector ~~with~~ a Newtonian. Its action was admirably good but I did not habitually use it - 1st. because being so near the aperture it contracted Dew so readily. 2ndly. because the deflexion to the side would have utterly deranged my whole system of sweeping in a singularly awkward manner and rendered necessary a total reconstruction of the whole Gallery apparatus Index Arc and Polar distance piece (??circle).

Still these things might have been done, and I believe the telescope would have been more efficient could the Dew have been well and conclusively kept down.

The prism was crown and the most exquisite thing as to workmanship I ever beheld. I still have it by me. Its faces are curiously worked circular by grinding on a concave tool.

1847 Sep 20. To E. Cooper (M P Sligo) "... The potato disease has gone off here in a way quite as strange & unaccountable as its coming on..."

1847 Oct 7. W.R. Birt. ... Let me thank you for having appreciated my position ... on the subject of personally engaging in any great Meteorological Scheme of enquiry ... I cannot undertake to do so ... I have too many other fish to fry. As to the Scheme itself ... that a Government office should be instituted to ... ~~organise~~ collect receive & register Meteorological observations from ... ships ... military stations (& why not also civil stations) I should like very well to see such an Office instituted provided ... (details as to how it sh. be done) ... Without some such distinct provision for reduction & discussion m. ? ? I look upon the mere collection of a mass of observations as of very problematic importance ... but if taken up on the great scale I have stated I should expect results of real ~~sc~~ scientific importance. ... I fear however "the Authorities" will look upon the scheme so enlarged as rather too Utopian .. especially .. that the scheme would not be complete without some organization of a system of observation in other nations.

1847 Oct 9. Sabine. .. As you defend the use of "forces" & consider there may be danger in substituting "powers" I can only hope that the further consideration you propose to give it, will cause you to take a different view .... My own objection to it is not so much its materialistic appearance in a religious view (for of course "force" as well as "power" is equally a delegation from and manifestation of the Creator) but that Science has outgrown it, and that it is impossible now to conceive mere mechanical forces to be the agents in producing the phenomena of the material universe .. without superadding causes antecedent to force & capable of producing forces destroying suspending or altering their intensity. To such causes I conceive the word "powers" to apply naturally & properly.

1847 Oct 17. To J.F. Bunbury. ... To Sir G. Napier & not to me or my suggestions be ascribed the honour due in establishing this system (C.G.H. School Establishments) It was not till called upon by him that I proposed any suggestions at all. So requested I certainly did draw up & hand in a paper of suggestions ... & I cannot object to its publication .. if Sir G. Napier does not. [Note Publ. by Bunbury in his work Journal of a Residence in N.C.G.H. 1848.]

1847 Nov 17. To W.H. Smyth ... Next Friday is the Nomination day for the Medals. .. There has been an idea that the Medals might with advantage to the Society be discontinued henceforward. I confess to a leaning towards that opinion. Nevertheless whatever the Council may decide on this point will receive my most willing acquiescence.

47.12.4 TO J. LUBBOCK.

My position with respect to the Astronomical Society being rather that of a stop-gap than of an officer actively and efficiently taking a part in and influencing the proceedings of the Socy. (the Presidency, though nominally vested in me being, by a clear understanding at my Election so to speak, in Company).

To Dr Lubbock

I am very sorry we cannot join you tomorrow but it is not easy for us to stir at this time & I have so much on my hands at present that I must not think of such a thing as a "day's pleasuring" for months to come....

47.12.16

47.12.7..54.

TO A. SEDGWICK.

Xmas is on its way to us: Somerville & Adams .. Will you come?....

We have all been round to-day in long procession (each holding on at the tail of the other) blessing the minced meat, (Did you ever hear of the ceremony?) and I hope it will make good pies for you.

1847. Dec 23. To Whewell. L^d Auckland has requested me to officiate as Editor in respect of a "Manual of Scientific Desiderata" (for R.N. Officers) (Whewell to write a set for "Tides") (Other writers Sedgwick, Birt, Hooker, Airy, Sabine, Beaufort)

1848 Jan 5. To Whewell. ... Just we have been in sad trouble from the very sudden death of a most valued & faithful servant, our Butler whom you may remember, an event which has marred our New Year's merriment most effectually. [Hanged himself in the cellar.] m. 7. H.

1848. Jan 11. To Smyth. ... The accounts from my good Aunt are such that I fear she will not survive another Anniversary. Should it be so I shall pre= pare a brief necrological notice of her. ... Pray excuse this scrawl. I hardly know what I am writing for circumstances have occurred which have thrown us into great confusion & in addition a lot of extraneous matter is crowded upon me on the principle that it never rains but it pours.

1848 Jan 19. To Sheepshanks ... My venerable Aunt breathed her last on the 9th inst in her 98th year. I will send Dr Morgan a brief necrologic of her to read at the Meeting.

1848 Jan 20. Abp. Canterbury. [Resigning Trusteeship of Brit. Mus.]
48. 1. 25

To Sabine

From your letter I learn with regret that Lord Northampton has announced in a manner rendering it irrevocable his intention to retire from the Presidency of the Royal Society.

With respect to the 3rd. Proposition on which you state Sir H. Delabechem Mr. Grove, Dr. Roget, Dr. Faraday and yourself to have agreed with the assent of Mr. Kennie and Mr. Christie to propose to a Special Council - viz. that the Presidency of the Society for the period of 3 years should be offered by the Council (subject of course to the approval of the Society) to myself, give me leave to say - while myself deeply sensible of the distinguished compliment implied in such a proposal that under my actual circumstances of Residence, and occupations, it is perfectly impossible for me to undertake the arduous and responsible (though most honourable) duties of that important office, and as you very properly observe that it is of much convenience not to lose valuable time in the present conjuncture, I think it my duty at once to say so in the most explicit manner, though I cannot do so without expressing to yourself and through you to others of my excellent friends whom you mention as having entertained the idea that such a proof of their good opinion will ever be regarded among the most gratifying circumstances of my life

1848 Jan 27. To De Morgan .... C. L. H was also elected an Hon'. Member of the Royal Irish Academy. The King of Prussia also presented her with a Gold Medal in acknowledgment of her contributions to the advancement of Astron' Scienie. She was born Mar 16 1750 as the day & year were then called, in Germany. If 1750 means 1751 then she was only in her 97th year. But are you really in earnest that in your state an event say a hundred years exact from this date (Jan 27. 1848) to have happened on Jan 27 1748, while the people who transacted the event said it hap= pened on Jan 15 1747? Is this a reality & does it really & bona fide affect all dates? and if so where, when & how did the Jumps take place & how many thousand errors have taken place in statements of matter of fact in consequence of so monstrous an innovation?

1848 Feb 3. De Morgan. ... I may now add that her Funeral took place on the 18 Jan & that the coffin, by order of the Crown Princess, was adorned with palm branches & that the King & the Crown Prince & Princess, to mark their respect for her memory sent each their coach & six to follow the hearse. If you can mention these circumstances ... it will gratify her friends in Hanover.

1848 Feb 7. De Morgan ... I think it would be well to mention that the predecessor of King Ernest - The Duke of Cambridge (a thoroughly kind hearted & good sub though a little too vocabulous) during his Government of Hanover also showed her great kindness & attention. These matters ... are held of great importance in Hanover & indeed in all Germany.

(De Morgan cont'd.) 26/7/48 ... What I am after all most at-sea about is Lubbock's Planetary Theory. I thought I had some ideas about it ... but I find I want clear & definite notions. ... If not I shall flounder miserably & Lubbock will look like one of the "Transversa Terentes" (i.e. skewy wags) at me all the rest of his life for wasting him & myself down as two asses & so killing two birds with one stone.

Talbot 48.2.29 I have much on my hands which has no connexion with Science and am moreover kept hard at work in Scientific matters not of my own choosing and so prevented from working at subjects of my own choice among which the chief would be physical optics - but alas! optical experiments shall I never, I fear, be able to make more!

De Morgan. 48.3.11 Babbage writes me that he has looked over all his papers but finds no trace of the origin of the A.S.

"My memory" he says, "gives me the general impression that it arose thus Pearson suggested - saw that it was good but was not himself able to effect it. That Baily and others often discussed it at South's in Blackman St., and that Baily then undertook the foundation of it in conjunction with many who willingly assisted. Baily's perseverance and business habits made it successful".

And further, this deponent saith not. [see JFWH's own diary of 1820.]

1848 Mar 6. D. Somerville ... (thanking for objects!) ... what strange & exciting events are in progress! We pass half of every day in reading the newspapers & wondering what is to be the end of it.

1848 Mar 23. D. Northampton. ... We have most unfortunately friends from the Cape ... which will prevent my having the pleasure of dining with you on Saturday the 1st which I regret extremely. Many thanks for your kind & gratifying expressions, relative to the R.S. Independent however of the incompatibility of the office with the due performance of my private duties, I feel that it would be utterly inconsistent with the dignity & importance of the office itself that it should be filled by one who could only devote to it a comparatively small share of his time & attention. The deficiency in this respect permit me to add, would have been rendered glaring by the contrast offered in that respect by your Lordship's unremitting assiduity & devotion.

1848 Mar 26. To W. Somerville .... The whole interest of life seems concentred in the newspapers at this moment. What a crisis! What a trimmish for England if she can show to the world the spectacle of a State superior to such paroxysms & holding an even course of social amelioration without being led away into any wild vagaries such as our vivacious neighbours seem to think so very sublime!

1848. aps. To Sedgwick. It is true I could suggest a modification of the nebulous theory — that the Sun consists of all the materials which motions have opposed each other & which have hit against each other & fallen dead in the great chaotic scrummage, the actual rotation being only the difference of the + and − rotary momentum. And this I am disposed to think is the legitimate working out of my Father's views of the nebulous aggregation. But it is not what is commonly called the "nebulous hypothesis".

Your old friend the Influenza has come among us. Lady H has now had it these 5 weeks. .... I also am gradually falling under its influence & with me the "mucous" stage is commencing after about a fortnight's continuance of sore throat & tracheal irritation. The excessive prostration of strength is its worst feature.

Whewell
Lubbock's Planetary Theory

Friends and Dates

Foundation of Ast. Soc. Vol I p 6

RS question

Politics The Revolutions on the Continent

Sedgwick on the Nebular Theory

1848 Ap 21. Liddell. [re Mechanic's Institute at Slough. Will he be President? Was He?]

1848 Ap 24 To De Morgan.. I have a paper sent to me for the R.S by a Mr Forbes of Glasgow ... I suspect some slips of the pen somewhere. [Is this valuable?] [Ask F.H.]

1848 Ap 25. ... I enclose my eldest boy's working out of Fagnani's Theorem .. it tickled his fancy much.

1848 May? De Morgan ... As the Council is at 4½, perhaps 3½ will suit you. Anyhow let me know to that effect as I have a horror of engagements in London by implication of any kind.

1848 June Beechey [re a Submarine sympiesometer?. Seems to have "tickled his fancy" & he let himself go.] M.F.H & also June 18. June 20.

1848 Aug 2. H. Venn [About fixing language pronunciation. Thinks a new "character" is needed, somewhat like Pitman & his shorthand. See Phonotypic Journal Nos 30 to 42, "The Alphabet of Nature"]... I shd not despair by the aid of dots above & below (and with one or two new characters) to construct a tolerably complete system. In fact such has been the practice adopted in my own attempts on this subject since 1833. Though never fully satisfied with the result, ...

1848 Aug 10. To Miss Quincey. ... (re James Graham's Biography) M.F.H. ... it is impossible not to regard the state of France at present as a place of residence to English persons or indeed to any persons who are unfortunate enough to find their lot cast among a people so abandoned to their own ill-regulated passions & so utterly incapable of rational self government ...

48.9.20.

To Struve 48.9.20 TO M. FUSS, PULKOVA.
Contains a useful TO L. CLAUSEN, DORPAT. list of the Russian Observatories & R. astronomers of the day.

I am engaged in preparing a fresh edition of a work which I published some years ago in Astronomy and which will appear under the new title "Outlines of Astronomy" in which, inter alia, I think I have put the theory of the motion of the apsides of the moon and planets and their eccentricities in a form of the most elementary simplicity and in a point of view which I am utterly astonished did not occur to Newton himself and which would have spared an enormous waste of labour and thought to his commentators.
(We are much disappointed at not yet seeing the Great Comet but Mr Hind etc.)

1848. Sep 22. Lassell. There seemed to have come a lull in the storm of astron: discovery, but it was only, it seems the centre of the hurricane .... [What has Lassell now got?] M.F.H.

1848. Oct 11. To Lassell .. Bond, of Harvard USA has, I am provoked to say got the start of you by one day in the new Satellite of Saturn ... Why did The Times delay so long to print your letter If I recollect aright this is not the first complaint of the sort agst that Journal en fait des decouvertes astronomiques.

1848 Oct 15. Two letters to Lassell's ~~Sup~~ embodying the principles of "discovery" entire letters. also Oct 11th entire.

1848 Oct 15 Lassell (more about Bond & Lassell, might be copied.")

" Oct 15 " ("a draft" "to be kept as it embodies a principle" Hyperion. FHWH.)

1848 Oct 21. Airy (re Newton & the moon's orbit. Is this "my eye" ??)

1848 Oct 21 J.C. Adams (re the same.

1848 Nov 7. W.H. Smyth (re Lassell & "Hyperion". "he who creates the ~~instrument~~ telescope and uses it as a labour of love.") see also Feb 1.

1848 Dec 23. Argelander (of Bonn.) .... I resign my Office of President R.A.S in February. & I shall be succeeded by Mr Airy. Hind / For. Sec: R.A.S.)

Mechanics Institute Slough

Wille [illegible] [illegible]

Submarine instrument

The pronunciation of language

Condition in France 1848

New Edition of Outlines of Astronomy

Moon's orbit [illegible]

Discovery of Hyperion [illegible] by Lassell & Bond p45

[illegible] to Times

Letters to Lassell's (copy)

[illegible] to [illegible]

Moon's orbit

[illegible]

1849. Feb 1. De Morgan. ... Sheepshanks wrote me word that you & Sir Baily would arrange for a fitting place in the apartments of the Ast Soc: for the Bust of the late J.B. I have myself the organ of Localisin & that of Taste in the fine arts, so nearly obsolete in my cranium that I can form no judgment on the subject. .... I presume now Feb: is begun that the Report is in progress. My share in the business will, I apprehend be only to eulogize Mess Lassell & Bond i.e the former directly as Medallist, the latter by incidental mention of the honor conferred on him in making him an Associate & its motive & taking care not to touch on any question of priority about Hyperion though as an independent discoverer he cannot but be spoken of.

1849. Mar 19. L'P-Northampton ... I welcome ups on the Wold to attend the Levee (my only possible opportunity this season.)

1849 Mar 19. Le Verrier. ... But, for this (being a very slow calculator) I have not had time ...

49.3.27.

TO A. De MORGAN.

P.S. Voilà a connundrum of my wife's who sometimes perpetrates things of that sort. Why is England the most algebraical of Nations? Give it up - eh ? Because all the ex-wise-heads of foreign nations fly for refuge to it!

49.5.13.

TO W.H. SMYTH.

I return Mr. Nasmyth's interesting letter. I am very glad to hear he proposes to become an F.R.A.S. The Society wants just such members. I shall be most happy to add my signature to his certificate.

It is hard if great telescopes do not come into use. Mr. Nasmyth's looks elegant and manageable and (with a sentry box and writing desk for the observer) very comfortable. Indeed on that construction the eyepiece might be introduced into a hole in one's study wall and one need not go out of one's warm room, nor quit one's fireside. If I had the pen of De Morgan I would sketch Mr. N. Mr. Lassell, Lord Rosse, and a few chosen members of the A.S. (yourself of course included) sitting over a comfortable bottle of Claret with all the appliances of comfort, discussing the wonders of the last great Nebula that entered the field - taking turn at the eyepiece while the glass went round among the rest - and when any newer marvel presented itself giving the "View - halloh!" and all jumping up to look at it.

1849. June 13 To Jones. ... I had the honor of an introduction to Louis Philippe the other day at St Leonards. I went with an old Schoolfellow J.A. Gordon who seems to be on very easy terms with him & we were nearly 2 hours with him, he all the while talking with the utmost freedom & openness of all the affairs of his own Government & of the events of the Revolution, the state of France, character of the French & their prospects "I lay my hand on my heart" he said "and pray, Domine salvum fac Praesidentem" etc. He talks of his "fall" & of his present situation as of those of an indifferent person &, in short, takes the matter quite en philosophe. Only of the 'red men' he entertains a holy horror (as well he may) & cannot contain himself in speaking of them.

1849 Nov 15. [To E.J. Lowe, re an Observatory he intends to set up in the Midlands & endow.]

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50.9.5.

TO J.A. GORDON.

I stated I had no intention of offering myself for Cambridge....

I am a being of contemplation rather than of action and by coming forward as M.P. (supposing success) should, I am perfectly and entirely aware only be bringing unmerited discredit on myself and the class to which I belong.

Do not be offended. I know not what your means are. I suppose them to be large. Sure I am that Providence never placed ample means in hands more eager to dispense them for good and useful objects. But now let me tell you how I stand situated in a matter which I consider as a first duty, which I must satisfy, but cannot do so without something more than inconvenience. My nearest, in fact my only male relative (not to go back 3 generations) a man of the most spotless character, a guileless being who has struggled hard against adverse circumstances for a small competency which at last he was only able to sit down on by clubbing together an only Sister's property with his own - stands actually on the verge of something very like actual destitution owing to the strange and unaccountable fatuity of that Sister - bordering on insanity (and which I believe to be such) recklessly and absurdly squandering money which ought to go to their joint support. It is a long and a sad history, that of my poor Cousin, Thos. Baldwin - of which at this moment it is not necessary to say more than this that, £200 given to him through me, would be in the most emphatic manner given to myself and would spare my own resources to that amount and convey with it the peculiar delight of propagating kindness onwards from man to man. To this extent then, and for this purpose (if approved) I will most gladly and gratefully give you the name of my banker (Drummond).

This Pau is a lovely spot, or rather the environs are so. For rich home hill scenery backed by higher mountains, I have never seen anything like some excursions we have been making; but I am told it is nothing to what we shall find in the recesses of the valleys of the Pyrenees.

1850. Jan 24 De Morgan, ... Pope Gregory, it seems, reformed the Calendar ... is this all right. (Look this up in De Morgan's letters.) (Op 229 JFWH.)

1850 Jan 26. Lord Jeffrey. [Reply to a query about "probabilities". JFWH seems now to be a Universal Referee.]

1850 Mar 16 To De Morgan. ... But ever since that horrid spell of all kinds of tracheal, nasal & bronchial annoyance I had in town & all through this horrible winter up to now [when did he installed that Stove? see Beth.'s letters] I have been but half alive in an odious state of semi-torpor which disinclined partly & partly has disabled me from reading anything, doing anything and almost thinking of anything. Au reste, I tried to read your Logic but Oh dear! or dear! I found myself dead beat & I must wait for clearer weather in my own upper regions before I can venture on another assault on it. Meantime which I have taken to Cataloguing Nebulae as a sedentary and mechanical process which requires little thought and occupies much time — being in astronomy much like what worsted work is for ladies. ... I have been reading a wild book about the Pyramids to prove the Omniscience of the ancient Egyptians by a certain Mr Taylor. It wants to make out that the Egyptians had our inch & foot & that they knew the dimensions of the Earth ..... (long dissertation thereon, then) ... I think I shall draw up a little note of it for the Athenaeum ... etc) Op 230.

1850 May 5. Whewell. ... Lord John, has not, nor has any body else, consulted me about the Visitation. If he had I should have told him it would be to say the least, ill-timed when the Universities really are endeavouring manfully to stand up to their task with an intention of improvement.

1850 May 31. To T.R. Robinson. ... No doubt the diligent study of the Nebulae visible in these (? Southern Hem.) latitudes may in progress of time bring out such points in their history as may connect the Nebulae generally in some intelligible manner with the rest of astronomy ... When that time arrives (& it seems to me yet very remote) it will find the art of making, mounting, and observing with such instruments far more matured than at present & what is done will be done with far greater advantage.

1850 Aug 7. von Humboldt. ... An accurate chart of the Northern Via Lactea is still a desideratum. My impression is that its medium course around the heavens, neglecting local irregularities, is very nearly a Great Circle ...

1850 Aug 21 To Whewell. ... I write in a room ... The light is a very diffused one. The Sun never enters except very obliquely in Summer. ... P.S. We start for the Pyrenees & the Auvergne Volcanos on Monday next. ... I have taken service in the Universities Commission conceiving that if moderate men & well-disposed to the Universities were all to decline, the alternative must be people not-so disposed to the great detriment of the cause of sound principle & learning. Au reste, I stand pledged only to a year's service, making it a matter of express understanding that I shall be at liberty to resign at the expiration of that time without its being taken to indicate any opinion on the measures which the Commission may have adopted, or be in process of adoption, at the time, should it continue longer.

1850 Oct 22. Mrs White. ... There is a natural phenomenon in your garden.

1850 Oct 31. To J.D. Forbes (à Auvergne) .. By the bye in 20 years that superb monument (the "organs of Espailly) will have ceased to exist. The Frenchman who respects nothing has set his mark on it & the noble columns are in process of swift conversion into road-posts & vineyard walls. Geologists should join in a supplication to the French Govt to interfere in conservation of that most precious relic ... What are we to believe about the friperine (volcanic breccia) of Le Puy? I mean the castellated rocks Corneille, Polignac, Aiguilhe. I am half inclined to hazard a theory that they are the feeders from below of eruptions of semi-fluid pasty matter, which, where it overspread the surface, has been since swept away by the erosive process (whatever that has been) & only left outstanding where it had a root in the rock beneath of unlimited depth. Large fragments of the gneiss of the country are imbedded in that of the Corneille. [Note. "Despite of

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1850 Mar 16 ... I have been but half alive ... which disinclined partly & partly has disabled me from reading anything, doing anything and almost thinking of anything. ... I tried to read your Logic but Oh dear! or dear! I found myself dead beat & I must wait for clearer weather in my own upper regions before I can venture on another assault on it. Meantime which I have taken to Cataloguing Nebulae as a sedentary and mechanical process which requires little thought and occupies much time — being in astronomy much like what worsted work is for ladies.

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1850 Mar 16 To De Morgan. ... But ever since that horrid spell of all kinds of tracheal, nasal & bronchial annoyance I had in town & all through this horrible winter up to now [when did he installed that Stove? see Beth.'s letters] I have been but half alive in an odious state of semi-torpor which disinclined partly & partly has disabled me from reading anything, doing anything and almost thinking of anything. Au reste, I tried to read your Logic but Oh dear! or dear! I found myself dead beat & I must wait for clearer weather in my own upper regions before I can venture on another assault on it. Meantime which I have taken to Cataloguing Nebulae as a sedentary and mechanical process which requires little thought and occupies much time — being in astronomy much like what worsted work is for ladies. ... I have been reading a wild book about the Pyramids to prove the Omniscience of the ancient Egyptians by a certain Mr Taylor. It wants to make out that the Egyptians had our inch & foot & that they knew the dimensions of the Earth ..... (long dissertation thereon, then) ... I think I shall draw up a little note of it for the Athenaeum ... etc) Op 230.

1850 May 5. Whewell. ... Lord John, has not, nor has any body else, consulted me about the Visitation. If he had I should have told him it would be to say the least, ill-timed when the Universities really are endeavouring manfully to stand up to their task with an intention of improvement.

1850 May 31. To T.R. Robinson. ... No doubt the diligent study of the Nebulae visible in these (? Southern Hem.) latitudes may in progress of time bring out such points in their history as may connect the Nebulae generally in some intelligible manner with the rest of astronomy ... When that time arrives (& it seems to me yet very remote) it will find the art of making, mounting, and observing with such instruments far more matured than at present & what is done will be done with far greater advantage.

1850 Aug 7. von Humboldt. ... An accurate chart of the Northern Via Lactea is still a desideratum. My impression is that its medium course around the heavens, neglecting local irregularities, is very nearly a Great Circle ...

1850 Aug 21 To Whewell. ... I write in a room ... The light is a very diffused one. The Sun never enters except very obliquely in Summer. ... P.S. We start for the Pyrenees & the Auvergne Volcanos on Monday next. ... I have taken service in the Universities Commission conceiving that if moderate men & well-disposed to the Universities were all to decline, the alternative must be people not-so disposed to the great detriment of the cause of sound principle & learning. Au reste, I stand pledged only to a year's service, making it a matter of express understanding that I shall be at liberty to resign at the expiration of that time without its being taken to indicate any opinion on the measures which the Commission may have adopted, or be in process of adoption, at the time, should it continue longer.

1850 Oct 22. Mrs White. ... There is a natural phenomenon in your garden.

1850 Oct 31. To J.D. Forbes (à Auvergne) .. By the bye in 20 years that superb monument (the "organs of Espailly) will have ceased to exist. The Frenchman who respects nothing has set his mark on it & the noble columns are in process of swift conversion into road-posts & vineyard walls. Geologists should join in a supplication to the French Govt to interfere in conservation of that most precious relic ... What are we to believe about the friperine (volcanic breccia) of Le Puy? I mean the castellated rocks Corneille, Polignac, Aiguilhe. I am half inclined to hazard a theory that they are the feeders from below of eruptions of semi-fluid pasty matter, which, where it overspread the surface, has been since swept away by the erosive process (whatever that has been) & only left outstanding where it had a root in the rock beneath of unlimited depth. Large fragments of the gneiss of the country are imbedded in that of the Corneille. [Note. "Despite of

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1850 Jan 24 ... Pope Gregory, it seems, reformed the Calendar ... is this all right. (Look this up in De Morgan's letters.) (Op 229 JFWH.)

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Jan 31. Rode with Town & attended Genl Napier's first Levée.
Thence with Maclean & Lt Williams to Mr De Witt's to recommence La Caille's Station.

Feb 1 Call & Lady C. Bell & Mr Chas Bell & Mr & Mrs Haugh dined here. Also Capt & Mrs Wauchope. In Evening came His Excy Genl Napier & 2 Miss N. etc to see Stars with Capt Napier Mr Craigie Mr Bunbury etc.

Feb 6 Hard at work all morning copying D Stars to go by Thalia

Feb 7 (Met Maclean at De Witt's) Conferred about Sector. It appears to me there is flexure in the tube, which Maclean attributes to the counterweights - expects to take off by equalizing their strain. But I think it is in the tube along its whole length. Rode with Mr & Lt Williams up to the Hill & the "Platte Klip" in face of the Table Mountain, to select a spot for the erection of the Sector to get attraction of the Hill. (Willy etc came back, all well)

Feb 8 Dismantling of the 20ft in process.

Feb 12 Dined at Govt House. Present only Genl Napier & family

Feb 13 Pulled down the roof of the Equat & dismounted & pulled to pieces the Instrument ready for packing.

Mar 7 The Windsor came in last night, so all put in activity for embarkation: and all arrangements for leaving Feldhausen. Dr Liesching & Mrs Smith (surgeon of Windsor) reported Willy fit for going on board, so putting him in blankets with Mama & Mrs Hutchinson in carriage & the children & Nurses (Macqueen & Mrs Stumpfhis Lea & Catterina) with Baron Ludwig's waggon, packing & dispatching the cart full of baggage with Steve, and Mrs Hutchinson's covered cart also loaded with James as driver, mounted "Old Harry" & after brief adieus, I all stepped away down the glorious Avenue of Feldhausen - never turning a head to look back!

Mar 11 Rose at ¼ before 1 a.m & with great exertion completed final packing Called at Govt Ho. just in time before Genl Napier went to Church with Fairbairn's letter about Stockenström in hand, which N. very properly refused to have read giving reasons quite unanswerable, but adding afterwards (in private conversation) that should any such letter to be quite unnecessary, viz: that in the execution of his Office he sh. support S. to the utmost, consider any mark of disrespect shown to him as shown to himself & to the further effect that he considers S.'s character to be quite untouched by the result of this trial. Took leave of His Excy ... also C. Bunbury whom I met in the street. From Saunder's ad[illegible] a note to Fairbairn which I gave to Maclean in the boat slating result (public part) Rode to Sette a fond m. B. H & all ready & quite about to embark in Capt Banca's launch (Capt B. having placed it at our disposal in the m.) & came also) Willie blanketted up in a Sedan Chair in the boat. and about Noon were fairly aboard the Windsor which immediately weighed Anchor & was off with a moderate but perfectly fair S.E wind & in less than half an hour was rounding Green Point at 2½ p.m fairly off the land with the noblest view of the Table Mountain etc imaginable. Sketched it & passed rest of day getting into some degree of endurable disorder.

Mar 12 Passed an uncomfortable night, no undressing & little sleep & today set to work getting into sailing order but all goes slow & nothing gets done, it seems as if every motion required to be planned before hand & every now & then there come a still-stand. Sea sickness will almost be better than this, but M. (who is suffering under Mal-aise) says decidedly NO.

Mar 12 (Cont.) Scudding through a moderate swell in gallant style, every bit of canvas spread.
Began tonight to take temp.s NB. Capt H. observes Bar.s regularly.
Rigged up a net as a hammock in the dressing cabin, but it proved too narrow & the diagonals meshes bothered the thing, so between dozing & starting up to rearrange I passed a very bad night.

Mar 13 Rose at 6 more tired than refreshed with a very bad night.
Found my cabin boxes terribly mashed by the horrid Cape Waggons in their journies to Cape Town & shipping.

Mar 14 Unpacked & planted in earth all my (plants)
Began to read reducing the Magellan Accounts — maps obs.s but with little progress.

Mar 16 Rigged up a net of willow-wove work ... hoops 10 in diameter ... quite useless, the meshes all beaten to pieces.

Mar 17 Adapted the neck of a bottle to my net... (by the time he was ready the immunities had all disappeared!)

Mar 18 Divine Service performed by Capt. Harming on Deck attended by all the crew & 40 invalided Soldiers off ... a fine veteran looking set of men & very orderly & well behaved on board cum uxoribus et childebus.

Mar 22 St Helena in sight at daybreak ... got to anchor off James Town
It is a brown barren precipitous-coasted mass crowned by a broken & jagged summit.

Mar 29 The progress of the ships being slower proceeded to fish with the fine bobbin-net fishing-net & caught several sorts of very odd creatures.

Mar 31 Just across the Line:
[Description of fishing in F.71]

Apl 3 At dinner the Ship got stern-way & the net got entangled in the Stempost & I was obliged to cut it adrift.

Apl 5 A listless morning, occupied with trials to improve the suspension of a cot.

Apl 6 Devised a perfect Swing Cot .... Today about noon the NE trade began ..... The inclination of the ships to the lee-side most unpleasant.
The Cot answers very well .....

Apl 11 Rigged out a new net (description of fishing in F.71)
Finished Scott's Pirate & Boswell Tour to the Hebrides.

Apl 12 (Much fishing)

Apl 14 Fished. Dead calm.

Apl 18 Read the abominable History of the Thugs. Every thing one reads or hears about India & Indian affairs seems more hateful than the last.

Apl 19 (Fishing details in F.71)

Apl 20 Poor little Bella sea-sick. Carry hand 2 or 3 times daily & pretty & sang them to her mother's second, in a way which promises that some day if she takes pains she will one day sing very well. ... Wind increased to a gale, much pitching & rolling & everything very uncomfortable.

Apl 21 Head aches & utter discomfort from the ship's movements. To live on board ship is equiv.t to living in a perpetual earthquake on land with the prospect of being drowned instead of being crushed, as a catastrophe. Lay about on sofas listless & nauseated. Meanwhile it has fallen calm & what wind there is is nullified by the "Head Swell" & horrible cross sea.

Apr 24 Obsd. the Zodiacal Lights very bright, involving Mercury Hercules, passing through Gemini. S of Castor & Pollux & attaining Procyon Canis.

Apr 25 May not gone, the string having been cut off close to the Ship. Having no more proper net (Bobbin net) gave up fishing.

Apr 26 Ship rolling so as to make it hardly possible to stand.

Apr 29 Today at daybreak Pico & St George's were seen .... Wind freshening to a heavy gale ... a vile comfortless stormy night as to drink as pitch.

Apr 30 The gale abated. ... the ship lay over so on the Larboard tack, that the sea horizon appeared through the cuddy skylight as we sat at the end of the table .. beat by fits & starts but steadily.

May 4 Another miserably cold day & NE wind, making no progress. A man disorderly & violent had struck one of the officers, so the Capt put him in irons & on bread & water, till the ship shall be in dock & then assembles the Ship's Company at the Capstan & addressed them on the subject of Insubordn. .. Tacked ship

May 7 3 Ships in sight. One supposed the "Willington" which left St Helena the day before us. Green water almost bottle green. Capt Boswell saw a very large Whale close under the ship's stern, Back above water.

May 8 Full moon, superbly clear. (Star comparisons)

May 9 Packing & arranging for landing if we ever are to land but this obstinate NE wind making the prospect very poor.

May 12 Wind changed from E. to N.

— — — —

The Derwent SCRAP BOOK

70. May 11. Proctor. corrects some ... P's "Other worlds than ours". Nothing original.

Apr: 1. Proctor. Comments on some remarks in P's "Other worlds". References to his (Proctor's) branch is might be quoted.

69 Sept 20, 21, 22. Huggins. Suggestion to test spectroscopic method (of measuring velocities) on mercury. Worth quoting, though scarcely practicable in these latitudes. Nothing, however, has been tried by Huggins.

Aug 21. T.R. Robinson. Re supposed changes in η Argûs nebula. (These were fallacious. Since shown to be due to errors of obsn.) Not worth quoting.

Aug 20. Proctor. Distribution of stars & bodies in Universe. Nothing original.

✓ Aug 1. Proctor. Some sagacious remarks on galactic structure on pp 2 & 3. Worth quoting. I have marked them.

June 9. Huggins. Suggestion (not original) re trial of spectroscope on comets motion.

✓ May 30. Tyndall. Remarks on polarized light & comets. Not of any great importance, but show unabated interest in physical problems & speculations.

May 28. Tyndall. Discussion of a suggestion of T Re comets, now known to be ill-founded. Best not quoted.

Mar: 27. Huggins. Solar prominences & Radial velocity of Sirius. Nothing worth quoting.

68 ✓ Dec: 2. Tyndall. Some "rambling suggestions" re cloud formation etc: Not well founded. The encouraging tone of JTW's letters to Tyndall & other investigators is noteworthy, as always.

✓ Dec: 14. Tyndall. Remarks on polarization. Too vague to say how far important.

Nov: 26. Tyndall. Polarization of atmosphere & corona. Nothing original.

Nov: 22. Huggins. Solar prominences. Polarization of corona. Nothing original.

Nov: 24. R. Main. Points out discrepancies (? errors of reading) in Radcliffe double-star measures. No general interest.

✓ Nov: 16. MacFarren. Musical scales. Shows very considerable knowledge of harmony: This fact is worth emphasizing & parts of letter might be quoted.

1871. Mar 1. [10] R.A. Proctor. Nature of corona & ... Contains no original suggestions. He evidently shares the ignorance of others of his contemporaries in this matter. Solar origin of corona was settled 10 years before.

Feb: 20. A. Brothers. — Ditto. Here again he is behind the times.

Feb: 7. R.A. Proctor. Polarization of Corona. Nothing useful or novel (in 1871). Remarks on 18 inch telescope worth noting. Already marked in red.

Feb: 2. R.A. Proctor. Nature of corona. See letter of March 1. He here beats a horse already dead in 1871.

Jan: 14. W.J.M. Rankine. Suggestion (ill founded) as to action of light on small particles.

1870 Dec: 22. G.B. Airy. Notes on some of JTW's early experiments on magnetism, in relation to ? priority of discovery of "astatic needle". Entirely personal & WH. Worth quoting in any case. i.e. the whole P.S.

✓ Nov: 3. W.H. Altree. A not quite correct (& not original) explanation of the connection between aurorae & magnetic storms. Not worth quoting.

✓ Oct: 23. Tyndall. A suggestion based on a misunderstanding of the nature & properties of the ether. Not worth quoting.

Sept. 30. Huggins. mentions his (JTW H's) compilation of a double star catalogue. Vague suggestion re sunspots. Nothing worth quoting.

Aug 31. Carus Selwyn. Remarks on a phenomenon already long before noted by others.

Aug: 29. J. Hewlett. The same.

June 7. Tyndall. describes an early experiment of JTW H. never carried out. Hardly worth quoting.

May 16. Proctor. Only thing worth quoting is the first par, (already marked) illustrating ~~JTW~~ JTW H's humility & open mind.

1868. Nov: 10. O'Connor. results of eclipse to confirm a theory of his. Ordinary the data were insufficient & misleading. Not suitable for quoting.

Oct: 23. Selwyn. Points out clerical error in dating of S's solar photographs. Refers to a current but ill founded theory of the sun re cause of sunspots. Nothing worth quoting.

✓ Oct: 1. Sabine. Polarization of corona. Points out a fact that was well & generally recognized. Not original enough to quote

Sept: 29. R. Main. Complains of the numerical errors in Secchi's Double-star cat. Nothing to quote.

Sept: 26. Selwyn. Sunshot obsns. Suggestions re Earth & their origin ill-founded. Nothing to quote.

✓ Aug: 6. Huggins. Composition of Comets & tails of same. One sentence worth quoting as being very near probable truth as held today.

July 31. Huggins. Vague summaries about comets. Nothing useful.

July 6. Huggins. Spectra of comets. No constructive suggestions.

1866. Sept: 30. Dallmeyer. Gives correct explanation of an optical ghost. A simple piece of optics which anyone well up in the subject could have managed.

✓ May 5. Wolf. Eulogy of C.L.H. Worth quoting.

1865. Jan. 31. De La Rue. Attempt to explain "willow-leaves." [But this structure is non-existent & hence all reference to it should be cheerfully expunged now.]

Quarterly Journal Sci: Oct: 1864.

1861. Mar: 13. Fitzroy. remarks about tides. Objection to Faraday's term "lines of force." Nil last perhaps worth quoting

✓ Apr: 23. Airy. Interesting suggestion of "magnetic nutation". Cannot say how far valid.

1860. Mar: 19. Rogers. Original suggestion for calculating epochs of variable stars. This has been adopted universally. So, quite recently, has Rogers's suggestion (referred to here) re nomenclature.

✓ Mar: 17. Spencer. Remarks on the "Absolute". Candid remarks on Hegel.

1859 Jan: 16. Spencer. Some rather obvious criticisms of Laplace's nebular hypothesis. Corrects some mistakes in a "Review of Recent Astronomy" by S.

✓ 1858. Aug 27. Robertson. Suggestion for sewage system for London. [Unable to say if useful, or adopted.]

✓ Feb 6. Sabine. Some remarks indicating his abiding interest in chemistry. Otherwise nothing interesting

1841 Aug 10. Wm Talbot's paper (Calotype process) Later printed in Phil. Trans.

1847. Mar 1. J.P.W.H's actinometer.

1847 Nov. 7. Cooper's asteroid. ? Metis.

1848. Oct 21. Adams. 21. Peacock. 25 Airy. 26 Airy. } Submit to ? J.J. Lunar theory.

1856. Sept 11. Describe collimating telescope.

1858. Jan. 30. Whewell. Ideas on magnetic storms impossible now to know how far they were shared by his colleagues. He appears (as so often) to be emphasizing the obvious, & there is a risk of imputing too much originality to him.

Jan: 20. Mrs Somerville. Refers to article on Meteorology in the Encycl. Britt: already published by him. Q.V. for anything good it may contain.

1857. Mar. 3. Sabine. Reference to a letter of J.F.W.H's to Baily in 1837 suggesting connexion between sunspots & aurora. His original letter, if extant, should be marked for quotation.

1856. May 5. Osborne. Useful suggestions for work of P. Smyth's Teneriffe expedition. The fact of his being consulted by Admiralty is worthy of record. Smyth's book "Teneriffe, an astronomer's experiment" will probably record whether these recommendations were carried out.

1854. Jan: 27. Mrs Cornwallis. Points out a physico-physiological error made by Liebig.

1845. Apr. 15. Sedgwick. Interesting reference to his father & the Nebular Hypothesis. Worth quoting, but none of the rest.

1825. Jan 14. Amici. Already marked for quotation.

1824. Jan 31. Brewster. Some difficulties in the theory of colours. Some of these are still unsolved — & J.F.W.H. himself has no explanation to offer. As so often, he states the difficulty — as others have done.

1821. Jan 16. Kater. Communicates an original discovery about curves of object glasses. Cannot say if it had been found independently by others. (cf. Fraunhofer, Dollond etc:) These things were trade secrets.

Dr Stevenson's
commonplace
book letters
1868 - 1871

1851 de Morgan. Upset by death of Schumacher. Page 1
1851 Whewell. Question of Exchange and Currency
Correspondence about Naval Officer's Sc.
Manual now editing.
1851 Mrs. Somerville re Mastership of Mint.
London gossip. Politics.
1851 Shaw Lefevre re Waterhouse.
Abp. Cant. do
1851 Faraday. H's surprise at F's point of view on Magnetism
1851 Fox Talbot's Amphitype is the same name as Herschel had already but allows him.

1851 G. Bishop New planet Irene? Page 2
1851 Whewell about Lord J. Russell and Jones.
1851 Fox Talbot John Stewart wants to learn Talbottype.
Politeness about F.T.'s expd.
1851 Sabine. Geo-magnetism.
1851 Forbes J.F.W.H. confesses to 'incompetence'!!
re University at Sydney, N.S.W.
1851 Humboldt. Can't work as fast as he could.
Mint. Gr. Exhibition. MENTAL PROCESS
Lassell's discovery of 2 Satel. to Uranus. see back Vols.
1851 Bunsen says Maclear wants a Transit Circle at C.G.H.
1851 W. James Herschel re his start in the E.I. Co.
See p.4.
1851 Beaufort. H's "considered opinion" on a Transit Circle to C.G.H. Yes send.
1852 Cooper M.P. H. retreating from active astronomical work. MENTAL PROCESS.

1852 Miller. (Assayer to Mint?) Need of a better Page 3
balance at Mint.
1852 do. Mint ceases to use Troy weight.
1852 R. Grant. re undulatory theory of light and Kepler.
1852 Lassall L. at Malta with telescope.
1852 Miss Homer re Miss Oersted. Mental Process
1852 Peterson. Do not destroy Observy. at Altona p.2.
1852 de Morgan H. overwhelmed by Mint work.
Lady H. ill at Collingwood. Mental process
Cambridge Report will be signed tomorrow
(re Univ. Commission)

1852 Peacock asking him to "marry Carry." Page 3
1852 Faraday Dixy. of Periodicity of sunspots is the doorway to vast cosmical discoveries. See Outlines Astr. p.36 Art. 400. See Vol. VI, p.44.

1853 Airy. H's daughter Amelia badly burnt. Page 4
Mental process p.2
1853 de Morgan. H. wishes to know Hist. of Decimal Scales in other countries. See p.5.
1853 Fox Talbot. Thanks for Ph. Engravings.
1853 Struve Cannot do science and Mint
see p.5 Rossé Mental process
1853 Mrs. Somerville. do. do. also marriage of Carol and dep. of W.J.H. to India. p.2. Mental process.
About "table-turning" and spiritualism.
Disapproves.

1853 de Morgan Newton's papers at Mint vanished. Page 5
1853 Pritchard (H's sons' schoolmaster) Table-turning. Long letter snd. in toto. Mental process. p.2.
1853 Donaldson On teaching music a Professorship.
p.12. See p. 36 to Macfarran. Mental process. p.2
1853 Hind Equinoctial time.
1853 Miss Lipscombe A little rest at Hawkhurst.
Mental process p.2.4.
1853 Whewell Comments on Plurality of Worlds.
Disagrees playfully. H's Mint duties "making money"!!
1853 Lord Rosse. Cannot undertake life of Arago. Mental process
1854 Miss Cornwallis. H. feels"out of it."
Liebig's blunder.

1854 Rev. Jeffreys. H. had never lectured. About Page 6
lecturing to village Andrina.
1854 Mar. de Morgan on the new coins and bases at Charing Cross.
H's birthday makes him feel of the older generation Mental process
1854 J. Romilly re University Commission
1854 Mrs. A.V. Gordon, re Gordon friend of his youth.
1854 Sedgwick. H's health and Sedgwick's do. Mental process
Whewell's Inductive Sc. wrong
1854 Sabine H's health prevents his really attending Committees. Mental process
1854 Mrs. Jones re new florin
1854 de Morgan. deplores his overwork Mental process p.2.4.5
1854 do H's working hours. " "
1854 Whewell re ASH going to Trinity (good letter) "
1854 de Morgan "I stand corrected."

1855 Jan: Mrs. Jones. R.J. ill. H. do. "bad lag" MENTAL PROCESS

1855 Peacock. Declining new Cam: Commission.

1855 W.H.Smyth. H. feeld very ill. Daughter is amanuensis.

1855 de Morgan. Shocked at death of Sheepshanks. H. has been in bed 5 months. Dictates all letters.

1855 Sept. de la Rue. re Saturn & H's health. MENTAL PROCESS. p. 2,4,5,6,7.

1855 Nov. do. H's health.

1855 Bracket. do.

1855 de Morgan. do.

1855 do. do. & on spelling.

1856 Sedgwick. do.

1856 Col. Alex. H. Gordon. Consulting Gordon for Major Stevenson new Constabulary.

1856 E.M.Ward. (of the Mint) Aluminium in coins. also "pots & pans". And Gossip on Crimean Peace now proceeding. MENTAL RPOCESS p. 5,6.

1856 Osborne. Piazzi Smyth to Teneriffe. (See M.F.H's further extracts from P.S's book)

1856 Sedgwick. Lady H's ill-health.

1856 de Morgan. H's ill-health & gossip.

1856 J.J.Stokes. H refers to his own expts. in 14 Mar. 1823 at London Inst:

1856 J. Tyndall. Science of coining & Geology.

1856 Greig. (Mrs. Somerville's son-1st. husband) H. feels behind the times.

1856 W.H. Smyth. H's claim of priority collimating telescope 1833.

1856 de Morgan. H's confesses to lack of "noticing" peculiarities in persons.

1856 do. H's ill-health. Colour blindness. Decimal system will not come in England.

1856 Sedgwick. S's ill-health. H has been abroad. H's ill-health. Operations.

1857 Forbes. Piazzi Smyth's failure at Teneriffe.

1857 Sykes. Principle of barometer pressure measurments.

1857 Sabini. H's ill-health.

1857 de Morgan. Naval Handbook and Electric current & Aurora & cosmic electricity. Scientific gossip. Peacock ill. Vol. V. p. 7. MENTAL PROCESS Herbert Spencer's book. p. 2,5,7,9.

1857 Airy. H's ill-health.

1857 de la Rue. Suggests illustrated science picture book.

1857 Whewell. New Planet.

1857 de Morgan. Riddles. MENTAL PROCESS

1857 do. do.

1857 Whewell. re Louisa H's engagement to R. Marshall. see Whewell's marriage.

Foucault. Indian Mutiny & Willie.

1857 de Morgan. Willie & Indian Mutiny.

1857 Lassell. Clear Hawkhurst air.

1857 Lassell. re Collimetor. MENTAL PROCESS

1857 Smyth. Launch of the Leviathan. H's method for launching.

1857 do. do. Brunel. Times.

1857 Lloyd. Declines chair of Met. Conf.

1858 Mrs. Somerville. H's ill-health. Writes art;for Encycl. Brit. Meteorology. Also p. 14, 16.

1858 Whewell. Magnetic Stations for Surveys.

1858 Sabini. Accepts Chair Chemical Section Brit. Ass. Leeds. & R.S. Comt. on Terrest: Mag:

1858 Mrs. Somerville. Correction her error re Airy's Measurment of Earth. priority again!

1858 d e Morgan. Moment at which day changes from Mon: to Tues: circling the globe. MENTAL RPOCESS Accident to H's eye. p. 2,5,7,9,11.

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1858 de Morgan. Facetiae.

1858 Admiral Fitzroy. About Maury.

1858 Sabine re Humboldt's mental processes!

1858 de Morgan on Music. Algebra too fatiguing. brain fag. p.5. p.36, MENTAL PROCESS

1858 P.F. Robertson (M.P.?) Sewage of London. p.14.

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1859 Sabine Terrestrial Magnetism and politics.
1859 Robinson of Armagh. Ill health. MENTAL PROCESS p.2.11.13.14.
1859 C. May Opinion of metal for Big Ben.
1860 de Morgan. Intends to pub. a "Jokes Book". MENTAL PROCESS p. 2.11.13.14.
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1868 R. Main. Double Star Cat:
1868 Sabini. H's opinion of Lord Brougham as a scientist.
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1871 Andrews to Herschel. re H's Ice Calorimeter.
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From J.F.W.H. Harley Street, June 17/53.

My dear Ryan,

From all I can learn of Lord A. it would be positively injurious to Jones's cause were I to be the presenter of his letter or of a Memorial on his claims. It had far better come to him from Sir J. Graham or in the way of the most entirely public representation. The original Memorial or one similarly signed embodying it with a statement of present circumstances & of what has passed with Lord Derby should be placed in his hands. Old T. L. Hodges might not hesitate to do with one Minister what he has done with another - if indeed Lord John Russell himself who is a powerful & influential man in the Government might not take the matter up so far.

The Memorial once in Lord A's hands there would be nothing more natural than my addressing him a letter in support of it - but my belief is that with his ways of thinking and doing business, he will look to finding all the stray grounds of the case <u>fully urged</u> and fairly put before him <u>in one view</u> and that what the direct & principal won't do the collateral & supplemental won't help - unless indeed he should be put on asking further particulars in which case he will send for parties and question them. Yours sincerely

J.F.W.H.

P.S. My wife whose opinion on such matters I take to be a very sound one is quite of this impression.

JFWH's opinion of Lord Aberdeen.

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1851 Jan 7. De Morgan. (re, matter for the RAS Report...) I have been obliged to put away into a safe drawer ... everything of an astron[l] nature ... to be drawn out ... when it shall please God. ... The worst thing that has happened to Astronomy lately is the death of Schumacher. That is indeed a loss. It ~~disorganizes~~ deranges the organization of Astron[l] affairs over the world.

1851 Feb 2. Whewell. ... I have been looking into the Question of "Exchange" & "Currency" I think you and Jacob overestimate the 'wear & tear'. There is a distinction. Fair wear & tear is I apprehend very small & as for what is lost by unfair, it is only lost to the coin but not to the stock of Bullion in the country as it goes forth into (however reprehensibly) into the melting pot & thence into the market. I have reason to believe that the loss by fair wear & tear is nothing like what Jacob makes it. ... Will you give me your notion of a decimal coinage & the manner of introducing it & the scale to be ultimately arrived at. .... [Feb 2 to 27. Was largely occupied in Editing the "Naval Officer's Scientific Manual, for which Whewell had written "Tides". This required much correspondence.]

51.3.2..57.

TO MRS. M. SOMERVILLE.

First let me thank you for your congratulations on an event which I assure you took me very much by surprise and which has altered certainly for a long while - and perhaps permanently the even tenor of our lives. How far it will allow me henceforward to devote any considerable share of my attention to those scientific pursuits which I used to regard as my chief enjoyments is a problem which time must solve. At present the state in which the Establishment itself is - a state which may be almost called one of dissolution and reconstruction - commenced under my predecessor and on a plan of his devising - is such as to give no room for any other thought or occupation. Meanwhile we are comfortably ensconced (Lady H. and our 3 eldest girls forming my Londn family in a residence which suits us well and close adjacent to many of my old scientific friends - (the Fittons and Lyell's being inhabitants of the same street). We retain our home at Collingwood where the 5 juniors of our flock are with their Governess - and of our boys the eldest is just entered at Haileybury and the other two are at school at Clapham.

→ You will easily conceive in what a stir & bustle

→ this monster metropolis is at present, under the triple excitement of a ministerial crisis of a most singular & complicated nature, the preparation for the Great Exhibition & the prospect of a renewed agitation of the Papal Aggression Question. In fact people seem wild - (that is to say all who are out of their beds, for as a natural consequence of the mildest winter on record everybody almost is more or less prostrated with influenza. It is singular enough that we have not seen snow since October, when we travelled from Clermont (Ferrand) to Paris through a country on which the snow lay thick, & with every sign of the setting in of an early & severe winter. [This rest to be typed. A very good letter.]

1851 Mar 10. To Shaw Lefevre. [About Waterhouse's candidature for Curator of Dept of Building]

[do do To Abp. Canterbury do do.]

1851 Mar 12. To M. Faraday. ... Your speculations on the diurnal & annual variations as referable to the magnetization of oxygen, took me quite by surprise. I had no idea you had gone so far into the matter. I find them difficult to follow from the habitual use of so totally different a mode of "envisaging" the magnetic forces.

H.F. Talbot. 51.5.6. ... Use the name "Amphitype" by all means for your beautiful invention. My process to which I gave that name I could never bring to a certainty sometimes the effects were excellent but 9 times out of 10 the results were spoiled. No doubt by perseverance it might be assured - but it is lost in the marvels which arise daily. So pray have no scruple, I long to see some of your products. For the Solar eclipse such a process will be invaluable.

Correspondence between the Chancellor of the Exchequer (Sir Charles Wood) and Sir John Herschel, Bart., Master of the Mint.

October 1851.

C.W. to J.F.W.H. D.S. (Downing Street)
Friday Evening.

My dear Sir John, I cannot refrain from expressing to you and to Captain Harness the pleasure which I derived from my visit to the Mint this morning. I feel perfectly convinced that a new era of usefulness is begun in that establishment, and I am very glad to have contributed in any degree to placing at the head of it two officers who are so able and so willing to make it what the Mint of this Country ought to be. I can only assure you both that as far as it lies in my power I shall always be most ready and anxious to assist your efforts in improving the system and adding such things as may be necessary for the various purposes which ought to be connected with the Mint. &c. C.W.

P.S. I don't write to Captain Harness as I am sure you will have pleasure in communicating to him how much I have been pleased.

J.F.W.H. to C.W. Harley Street,
October 26th 1851.

Dear Sir Charles, It is hardly necessary for me to say that your kind note of Friday evening was inexpressibly gratifying both to myself and Captain Harness. You have seen the establishment as yet only in its incipient state under the new system and when it comes into full activity as it soon will do it will, I trust, be found still more worthy of your high approval your note conveys. Of that approbation however it is but just for me to say that Captain Harness must take the lion's share. The greatest merit which I can claim being that of fully appreciating and giving the whole weight of my position to enable him to carry out efficiently the wise and well concerted scheme on which the new establishment is constituted. There will still be some difficulties to grapple with but encouraged by the prospect of your continued support already so unsparingly afforded we shall go on with cheerfulness and confidence. &c. J.F.W.H.

Newspaper Cutting. Question in House of Commons.
Was Sir John to take an active part in the Mint or to superintend generally the operations?
Sir C.Wood said Sir J.H. was one of the best men of business he ever met with, he had taken a most active part in the proceedings since his appointment to the Mint. (£47,000 for the Expenditure of the Mint - The vote was agreed to.)

1851. May 20. To J. Bishop [What new planet Irene? In. 74]

1851. July 25. To Wheucle (about a letter to Mr J. Russell about Jones)?!?

1851. July 27. Talbot 2 [John Stewart wanted lessons in Talbotype:]
We are all astonished & expectation of being more astonished at your late experiments.

1851. Aug 23. To Sabine. I am myself unable to offer any formulae or ... which will facilitate the noble work you have in hand ... I never was a profound Geo-magnetist & it is now so long that I have ceased to follow up what I did know — that for such a purpose I feel myself quite incompetent.

1851. Oct ? J.D. Forbes. (JFWH & Airy, Malden, Dennison to find professor for the newly founded Univ? at Sydney N.S.W.)

→1851 Nov 8. To Humboldt. ... I fear you will consider me far advanced in that sort of petrefaction to which you allude ... but this has been with every one & with me in particular, an exceptional year. During the continuance of our "Great Exhibition" besides official duties, new to me & of a most onerous & responsible nature, I had to serve as one of the Jury in the Class of Philosophical Instruments, a thankless & extremely laborious duty, which occupied time which ought to have been otherwise disposed of & interfered with every other object. ....
The nature of my other avocations allows me little leisure for any scientific enquiry, and even in Astronomy so rapid is the progress which is making on all hands that I feel myself getting daily less au courant of what is going on.
→→ However our last steps with have an interest for you. I have very recently received from M. Lassell an announcement of his discovery, or at all events satisfactory verification of the existence of two inferior Satellites of Uranus. ... It is a great pity that the sky of Liverpool is so habitually overcast & full of smoke. .. [More & about 9th Exhibition:]

1851. Nov. To his Son (W.J.H.) [re his start in Bengal) ? If room.

1851. Dec 27. To Sir Francis Beaufort. [re a Transit Circle for C.G.H. His reasons very elaborate for agreeing on need having been asked by Admiralty.]
Read down (D St.)
... Their Lordships .. enquire my opinion as to the advantage of sending out to the Cape a Transit Circle, similar to the excellent instrument recently erected at the Royal Observatory at Greenwich ... I have well-considered the subject .... supply that establishment with an instrument similar in every respect. [1851. Nov 8. To Bunsen: I have just received a letter from our excellent Master, urging the supply of a Transit Circle to the Observatory there! (The Cape.)]

52.1.22

TO E. COOPER.

[On receiving "Stars near the Ecliptic" by E.C.]

Though it is now very improbable that I should ever again make any astronomical observations or engage in any astronomical or indeed any other scientific enquiry, yet I have not forgot to admire and appreciate great works of this nature.

Mint.

Until 1850, the Moneyer was responsible for the manufacture of the coin.

In 1850. Manufacture taken over by the State.

The Officers of the Mint were:

Warden,
Master
Comptroller
Assay-Master
Workers
Coiners
Subordinates.

Until 1678 Seignorage for coining was claimed by King. It was a deduction from the billion coined.

The "shere" or "remedy" as it is now called is an allowance, for the unavoidable imperfection of the coin in regard to both standard weight and fineness.

Function of the Mint as regards gold is to receive it in ingots from individuals & return an equivalent weight in Sovereigns.

Silver no longer a legal tender since 1816

Seignorage, formerly retained by Master of the Mint to defray cost of coinage has, since 1837 been paid to the credit of the Consolidated Fund.

New Mint erected on Tower Hill 1810.

1851. A complete change in the constitution & system of administration was introduced & the new Officers were:

Master
Deputy-Master
Comptroller.

Thus, the Mastership (which had become a Political Appt.) was restored to the position of a permanent office, the Master being the ostensible executive head of the establishment.

Operative Department was entrusted to the:

Assayer,
Melter,
Refiner.

The Moneyers (who had enjoyed privileges) had been the contractors with the Crown for the actual execution of the coinage, they were abolished & the contracts with the Crown were entered into by the Master of the Mint who also made subordinate contracts for the actual manufacture of the coin

In 1869 further changes. The Mastership was merged into the duties of the Chancellor of the Exchequer (with no additional salary) & Offices of Deputy-Master & Comptroller were amalgamated.

The changes in 1851 saved about £10000. & those in 1869 another £8000.

Assay.

A. Cupellation

a method of assaying.
Depends on the fact that molten litharge (monoxide of lead. PbO.) is capable of holding in solution oxides of other metals with which it may be brought in contact & thus separating them from unoxidisable metals (of which gold & silver are examples)

① For pure gold.
Take a clean piece of gold, wrap it in lead foil.
Make a cupel (a small vessel made of compressed bone-ash) which being porous will absorb the oxides & the precious metal will remain on its surface like a bead of quicksilver) & put it in the muffle.
Heat the muffle red-hot & then insert the wrapped up gold with the cupel. Retain red-heat for about ½ hr.
The lead foil will have volatilized & there will be a button of gold.
[Whilst this is occurring brilliant iridescent colours pass over surface of button & then "flashing" or "brightening" suddenly occurs.]
Hammer the button after slow cooling to remove any bone-ash etc.
Weigh the button for final proof of purity.

② For Silver Alloy.
Proceed as above. Then if presence of gold is suspected,
Dissolve button in 1:1 nitric acid & water.
Collect the black deposit remaining (i.e. the gold). wash, ignite, and weigh.

B. The Hamel Method (i.e. Gay-Lussac Method.)

① Divide a quantity of silver (whose percentage of [alloy impurity] is approx. known) into 1000.
1 gramme of silver.
Dissolve it in 1:1 nitric acid & water.
Puts this down gradually, a little at a time, a known quantity of solution of common salt standardized to precipitate 1 gr. silver.
When no more precipitate occurs, the total quantity of salt solution used will enable one to ascertain the amount of silver in the Silver Alloy, by means of the following equation:

$$A = \frac{10M}{W}$$ where: A = assay
M = Vol. of salt solution
W = Weight of silver alloy in grains

② For Gold Alloy. This is called the Inquartation method because there is about three times as much silver as gold previous to cupellation.
The assay-piece of say ½ gramme & the necessary quantity of silver are wrapped together in the lead foil & are cupelled as above.
The button of gold-cum-silver is flatted, annealed, rolled out into a fillet, annealed & then rolled into a 'cornet' between thumb & finger.
The cornet is then placed in a platinum perforated cup on a platinum tray in the acid (~~nitric~~) (sp. gr. 1.2) in a boiler of platinum; after 25 mins.

New method (a) The tray is removed, wash & put into another boiler of acid (s.g. 1.3) for 25 mins.
Removed, washed, raised to dull red heat in muffle, which causes the cornet to shrink & assume yellow colour of gold. Weigh.

(b) Old method in "parting" flasks.
Boil the cornet for 10 minutes in acid (s.g. 1.2) fill up with hot water & decant. Boil the cornet again in acid (s.g. 1.3) for 15 min: do do.
Wash. Place in porous crucible. Anneal at a red heat. Weigh.

C. Touchstone Method:

This gives an approx.te estimate of the composition of alloy without injuring the object.
It consists of comparing the appearance of a streak made with the metal on a hard basaltic stone of dark colour with the streak made by touch-needles, after having subjected the streaks to nitric acid.
The touch-needle whose streak most nearly resembles that of the unknown sample is taken as corresponding with it in composition. NB. The touch-needles are compositions made up of different known proportions of the metals contained in the unknown sample.

D. Density Method for gold a copper alloy. First ascertain density of the object. Then by a formula given in Chambers' Encyclop can find amount of gold present.
This is the means employed when not wishing to destroy the object in any way.

Trial of the Pyx. From each 1800 oz. of gold, and from each 720 oz. of Silver, two coins are taken.
One for the Mint & one for the Pyx.
Those for the Pyx are sealed up & put in the Pyx.
The Trial of the Pyx used to take place at Westminster at the Exchequer Office about every 10 years or thereabouts. Since 1870 it has been held annually at Goldsmith's Hall.
The weight of the total bulk is ascertained, as well as that of selected pieces and assays are taken from a bar formed by melting a number of coins as well as from separate coins.
The verdict recording the results of these several trials whereas the officers of the Mint from their responsibility in regard to the coinage, affords a public guarantee that the standard of the currency is maintained.

(For Gratuity) Parties referred to in Mr Arbuthnot's Letter of 6/9/54.

April 1st 1853. Names of the Officials in the Mint.

Registrar & ~~Asst~~ Accountant	Mr Elkins ?
1st Senior Clerk	Mr Hill
2nd " " & Melter	Mr Musket
3rd " "& Asst Coiner	Mr Buckle.
4th " "	Mr Swift.
1st Junior Clerks	Mr Cumberland
2nd do & Ass.t Assayer	Mr Sterry.
3rd do.	Mr Aberdein
4th do	Mr J.R. Brande. (whose father W.M Brande in ? Coining Dep.t)
5th do.	Mr Finch
Office Keeper	Mr Pearson
Housekeeper	Mrs Caulfield.
1st Messenger	B. Anderson
2nd do.	W. Lalor.
3rd do.	H. Elledge.
1st Packer & Teller	N. Ward
2nd do.	G. Bradley
3rd do.	N. Moore
4th do	J. Halley
5th do.	E. Cooke.
Resident Engraver	Mr J. Wyon.
Resident Assayer	Mr Field
Fireman	G. Bencher.

1850 Before Herschel's appointment to succeed Shiel (a R.C.) the Deputy-Master was Captain Harness.

1850 Chancellor of the Exchequer. = Sir Charles Wood.

1851 Provost of Moneyers = Sir Jaspar Atkinson

{Company of Moneyers & J. Nicol. R. Hamblyn, E. Enfield. R. Rintoul } Three Offices dispensed with July 11. 1851.
{Change of Office for the above Offered & Refused. = Enfield Chief Coiner; Rintoul 2nd Coiner; Brande 7th Clerk to Coiner; Finch 8th do do.

1854 Deputy-Master & Comptroller. = W.H. Barton
Monies coined by J.F.W.H. 16 Dec 1850 to 30 June 1854.

1851. Extracted from Report to House of Commons 26 July 1851. by J.F.W.H.

Mr Mattison ceased to be melter & refiner 31 July 1851.
Mr Bingley retires 31. July 1851 was Queen's Assay-Master & on Probation.
Mr Beckwith retired 30 June 1851 Master's Assay-Master
Mr Buckham retires 31. July 1851
Mr Capes retires 31 July 1851.

[1851 Report by JTWH. cont^d.]

Establishment of mint Office consists of:

Mr Barton Comptroller
Mr Forbes, Mr Hill, Senior Clerks
Mr Mushet Sen^r Cl & melter
Mr Buckle Sen^r Cl & Assis^t Coiner
Mr Cumberland, Mr Sulft. Junr Clerks.
Mr Storey Junr Cl. & Ass^t to assayer.
Mr J. Pearson Office-keeper
[illegible] Housekeeper

[illegible]

Mrs Dobbyn [illegible]
J. Taylor, B. Anderson, W. Lalor, Messengers.
W. Ward J. Bradley, Noah Moore, Jos: Haley Ed. Cook Packers & Tellers.
Mr Field Resident Assayer. (Master's Office) was formerly in Queen's Assay Office [JTWH. made him a Testimonial Oct/59]
Geo. Busher. Fireman to Assay-office.
Professor Miller of King's College
Professor Graham of University College } Assayers to the Mint.
Mr J. Johnson
Mr E Lewis Registrar & Accountant.

1851 Jan 7. De Morgan. (re, matter for the R.A.S. Report...) I have been obliged to put away into a safe drawer ... everything of an astron[l] nature ... to be drawn out ... when it shall please God. ... The worst thing that has happened to Astronomy lately is the death of Schumacher. That is indeed a loss. It disorganizes deranges the organization of Astron[l] affairs over the world.

1851 Feb 2. Whewell. ... I have been looking into the Question of "Exchange" & "Currency" I think you and Jacob overestimate the 'wear & tear'. There is a distinction. Fair wear & tear is I apprehend very small & as for what is lost by unfair, it is only lost to the coin but not to the stock of Bullion in the country as it goes forth = into (however regrettably) into the melting pot & thence into the market. I have reason to believe that the loss by fair wear & tear is nothing like what Jacob makes it. ... Will you give me your notion of a decimal coinage & the manner of introducing it & the scale to be ultimately arrived at. .... [Feb 2 to 27. Was largely occupied in Editing the "Naval Officer's Scientific Manual, for which Whewell had written "Tides". This required much correspondence.]

51.3.2..57.

TO MRS. M. SOMERVILLE.

First let me thank you for your congratulations on an event which I assure you took me very much by surprise and which has altered certainly for a long while - and perhaps permanently the even tenor of our lives. How far it will allow me henceforward to devote any considerable share of my attention to those scientific pursuits which I used to regard as my chief enjoyments is a problem which time must solve. At present the state in which the Establishment itself is - a state which may be almost called one of dissolution and reconstruction - commenced under my predecessor and on a plan of his devising - is such as to give no room for any other thought or occupation. Meanwhile we are comfortably ensconced (Lady H. and our 3 eldest girls forming my London family in a residence which suits us well and close adjacent to many of my old scientific friends - (the Fittons and Lyell's being inhabitants of the same street). We retain our home at Collingwood where the 5 juniors of our flock are with their Governess - and of our boys the eldest is just entered at Haileybury and the other two are at school at Clapham.

→ You will easily conceive in what a stir & bustle

→ this monster Metropolis is at present, under the triple excitement of a ministerial crisis of a most singular & complicated nature, the preparations for the Great Exhibition & the prospect of a renewed agitation of the Papal Aggression Question. In fact people seem unhinged - that is to say all who are out of their beds, for as a natural consequence of the mildest winter on record everybody almost is more or less prostrated with influenza. It is singular enough that we have not seen snow since October, when we travelled from Clermont (Ferrand) to Paris through a country on which the snow lay thick, & with every sign of the setting in of an early & severe winter. [This rest to be typed. A very good letter.]

1851 Mar 10. To Shaw Lefevre. [About Waterhouse's candidature for Curator of Dep[t] of Bo[t]

[do do To Abp[s] Canterbury do do.]

1851 Mar 12. To M. Faraday. ... Your speculations on the diurnal & annual variations as referable to the magnetization of oxygen, took me quite by surprise. I had no idea you had gone so far into the matter. I find them difficult to follow from the habitual use of so totally different a mode of "envisaging" the magnetic forces.

H.F. Talbot. 51.5.6. ... Use the name "Amphitype" by all means for your beautiful invention. My process to which I gave that name I could never bring to a certainty sometimes the effects were excellent but 9 times out of 10 the results were spoiled. No doubt by perseverance it might be assured - but it is lost in the marvels which arise daily. So pray have no scruple, I long to see some of your products. For the Solar eclipse such a process will be invaluable.

Correspondence between the Chancellor of the Exchequer (Sir Charles Wood) and Sir John Herschel, Bart., Master of the Mint.

October 1851.

C.W. to J.F.W.H. D.S. (Downing Street)
Friday Evening.

My dear Sir John, I cannot refrain from expressing to you and to Captain Harness the pleasure which I derived from my visit to the Mint this morning. I feel perfectly convinced that a new era of usefulness is begun in that establishment, and I am very glad to have contributed in any degree to placing at the head of it two officers who are so able and so willing to make it what the Mint of this Country ought to be. I can only assure you both that as far as it lies in my power I shall always be most ready and anxious to assist your efforts in improving the system and adding such things as may be necessary for the various purposes which ought to be connected with the Mint. &c. C.W.

P.S. I don't write to Captain Harness as I am sure you will have pleasure in communicating to him how much I have been pleased.

J.F.W.H. to C.W. Harley Street,
October 26th 1851.

Dear Sir Charles, It is hardly necessary for me to say that your kind note of Friday evening was inexpressibly gratifying both to myself and Captain Harness. You have seen the establishment as yet only in its incipient state under the new system and when it comes into full activity as it soon will do it will, I trust, be found still more worthy of your high approval your note conveys. Of that approbation however it is but just for me to say that Captain Harness must take the lion's share. The greatest merit which I can claim being that of fully appreciating and giving the whole weight of my position to enable him to carry out efficiently the wise and well concerted scheme on which the new establishment is constituted. There will still be some difficulties to grapple with but encouraged by the prospect of your continued support already so unsparingly afforded we shall go on with cheerfulness and confidence. &c. J.F.W.H.

Newspaper Cutting. Question in House of Commons.
Was Sir John to take an active part in the Mint or to superintend generally the operations?
Sir C.Wood said Sir J.H. was one of the best men of business he ever met with, he had taken a most active part in the proceedings since his appointment to the Mint. (£47,000 for the Expenditure of the Mint - the vote was agreed to.)

1851. May 20. To G. Bishop [What new planet Irene?] m. 74

1851. July 25. To Wheweell (about a Letter to W. J. Russell about Jones]?!?

1851. July 27. Talbot 2 [John Stewart wanted lessons in Talbotype.]
We are all astonished & at a expectation of being more astonished at your late experiments.

1851. Aug 23. To Sabine. I am myself unable to offer any formulae or ... which will facilitate the noble work you have in hand ... I never was a profound Geo-magnetist & it is now so long that I have ceased to follow up what I did know — that for such a purpose I feel myself incompetent.

1851. Oct ? J.D. Forbes. (JFWH & Airy, Malden, Dennison to find professor for the newly founded Chair ? at Sydney N.S.W.)

→1851 Nov 8. To Humboldt. ... I fear you will consider me far advanced in that sort of petrifaction to which you allude ... but this has been with every one & with me in particular, an exceptional year. During the continuance of our "Great Exhibition" besides official duties, new to me & of a most onerous & responsible nature, I had to serve as one of the Jury in the Class of Philosophical Instruments, a thankless & extremely laborious duty, which occupied time which ought to have been otherwise disposed of & interfered with every other object.....

The nature of my other avocations allows me little leisure for any scientific enquiry, and even in Astronomy so rapid is the progress which is making on all hands that I feel myself getting daily less au courant of what is going on.

→→ However our last steps will have an interest for you. I have very recently received from M. Lassell an announcement of his discovery, or at all events satisfactory verification of the existence of two inferior Satellites of Uranus. ... It is a great pity that the sky of Liverpool is so habitually over cast & full of smoke. .. [more & about 9th Exhibition.]

1851. Nov. To His Son (W. J. H.) [re his start in Bengal) ? If worn.

1851. Dec 27. To Sir Francis Beaufort. [re a Transit Circle for C.G.H. His reasons very elaborate for agreeing on need having been asked by Admiralty.]
Rmil down. (St.)

...Their Lordships .. enquire my opinion as to the advantage of sending out to the Cape a Transit Circle, similar to the excellent instrument recently erected at the Royal Observatory at Greenwich. ... I have well-considered the subject .... supply that establishment with an instrument similar in every respect. [1851. Nov 8. To Bunsen: I have just received a letter from our excellent Master, urging the supply of a Transit Circle to the Observatory there! (The Cape.)]

52.1.22.

TO E. COOPER.

[On receiving "Stars near the Ecliptic" by E.C.]

Though it is now very improbable that I should ever again make any astronomical observations or engage in any astronomical or indeed any other scientific enquiry, yet I have not forgot to admire and appreciate great works of this nature.

Mint:

Until 1850, the Moneyer was responsible for the manufacture of the coin.

In 1850. Manufacture taken over by the State.

The Offices of the Mint were:

Warden,
Master
Comptroller
Assay-Master
Workers
Coiners
Subordinates.

Until 1678 Seigniorage for coining was claimed by King. It was a deduction from the bullion coined.

The "share" or "remedy" as it is now called is an allowance, for the unavoidable imperfection of the coin in regard to both standard weight and fineness.

Function of the Mint as regards gold is to receive it in ingots from individuals & return an equivalent weight in sovereigns.

Silver no longer a legal tender since 1816

Seigniorage, formerly retained by Master of the Mint to defray cost of coinage has, since 1837 been paid to the credit of the Consolidated Fund.

New Mint erected on Tower Hill 1810.

1851. A complete change in the constitution & system of administration was introduced & the new Offices were:

Master
Deputy-Master
Comptroller.

Thus, the Mastership (which had become a Political Appt.) was restored to the position of a permanent office, the Master being the ostensible executive head of the establishment.

Operative Department was entrusted to the:

Assayer,
Melter,
Refiner.

The Moneyers (who had enjoyed privileges) had been the contractors with the Crown for the actual execution of the coinage, they were abolished & the contracts with the Crown were entered into by the Master of the Mint who also made subordinate contracts for the actual manufacture of the coin

In 1869 further changes. The Mastership was merged into the duties of the Chancellor of the Exchequer (with no additional salary) & Offices of Deputy-Master & Comptroller were amalgamated.

The changes in 1851 saved about £10000. & those in 1869 another £8000.

Mint.

Process of coining:

Each ingot (of gold 20 to 30 lbs weight) is weighed and tested as to its purity by assaying[1] before being melted.

It is then melted in crucibles or pots of plumbago (holding about 100 lbs

Into the red-hot pots, the gold & copper 22:2 are put.

Then poured out into bars and is so cast.

Then cast into bars (or bricks)

Next they are rolled between pairs of rollers.

Then annealed to reduce the hardness.

When rolled sufficiently thin they are called Fillets

They are then put into the Draw-bench & drawn between steel-blocks to the exact thickness necessary.

Each fillet is then punched by the Tryer, who cuts out a trial-blank to test correctness of size of fillet.

The Blanks, of which each coin is to be made, is punched out by machinery & the scraps left over called Scissel is re-melted.

Next the edge is raised & again Annealed & then dipped into hot dilute Sulphuric acid to remove oxide of copper from surface.

Then they are washed with water & dried in hot saw-dust.

They are next put into the press to receive the impression of the perfect coin. Then after being examined to remove any possibly faulty coin, they are weighed in the automatic balances.

Those of true weight are rung on coin anvils.

Some of these perfect coins are now taken for Assay as a final guarantee that they are within the limits as regards Standard fineness allowed by the Coinage Act.

(1) Method of assaying i.e. To determine the proportion of any specified metal in a given metallic ore or in an alloy.

I The ore is Roasted in an open dish (as in a muffle furnace)

II and then the process of Scorification takes place also in a muffle furnace in a non-porous fireclay dish or scorifier heated to red-heat, thus: (a) or (b)

(a) One part (powdered) ore is mixed in scorifier with 10 or 20 times its weight of granulated lead, $\frac{1}{10}$ its weight of borax & the whole left in the muffle for $\frac{1}{2}$ hour. Then it is poured into a cup-shaped iron mould & when cold the slag can be detached from the lead button, which contains all the gold (or silver originally present in the ore & can then be cupelled.

(b) The alternative process of fusion (otherwise called Crucible method) consists in mixing the prepared ore with red-lead, charcoal-powder carbonate of soda & borax, in proportions depending on the nature of the ore & then (placed in a crucible) heated for $\frac{1}{4}$ hr in a furnace. & then poured into a mould & a lead button containing (as above) the gold is obtained.

After these processes, the (A) cupellation method of Assaying is adopted.

Or the (B) Humid (i.e. Gay-Lussac) method may be adopted.

Then either III or IV. B

A. Cupellation

a method of assaying.
Depends on the fact that molten Litharge (monoxide of lead. PbO.) is capable of holding in solution oxides of other metals with which it may be brought in contact & thus separating them from their oxides (of which gold & silver are examples)

① For pure Gold.
Take a clean piece of gold, wrap it in lead foil.
Make a cupel (a small vessel made of compressed bone-ash which being porous will absorb the oxides & the precious metal will remain on its surface like a bead of quicksilver) & put it in the muffle.
Heat the muffle red-hot & then insert the wrapped up gold with the cupel. Retain red-heat for about ½ hr.
The lead foil will have volatilized & there will be a button of gold.
[Whilst this is occurring brilliant iridescent colours pass over surface of button & then "flashing" or "brightening" suddenly occurs.]
Hammer the button after slow cooling to remove any bone ash etc.
Weigh the button for final proof of purity.

② For Silver Alloy.
Proceed as above. Then if presence of gold is suspected,
Dissolve button in 1:1 nitric acid & water.
Collect the black deposit remaining (i.e the gold). wash, ignite, and weigh.

B. The Hunad Method (i.e Gay-Lussac Method.)
Divide a quantity of silver (whose percentage of alloy purity is approx ½ known) into 1000.
1 gramme of silver. To find out how much of this contains
Dissolve it in 1:1 nitric acid & water.
Add this powr gradually, a little at a time, a known quantity of solution of common salt standardized to precipitate 1 gr. silver.
When no more precipitate occurs, the total quantity of salt solution used will enable one to ascertain the amount of silver in the Silver Alloy, by means of the following equation:

$A = \frac{10M}{W}$ where: A = assay
M = Vol. of salt solution
W = Weight of silver alloy in grains

2 For 9 old Alloy. This is called the Inquartation method because there is about three times as much silver as gold previous to cupellation.
The assay-piece of say ½ gramme & the necessary quantity of silver are wrapped together in the lead foil & are cupelled as above.
The button of gold-cum-silver is flatted, annealed, rolled out into a fillet, annealed & then rolled into a 'cornet' between thumb & finger.
The cornet is then placed in a platinum perforated cup on a platinum tray in the acid (sp. gr 1.2) in a boiler of platinum; after 25 mins.
New method (a) The tray is removed, wash & put into another boiler of acid (s.g 1.3) for 25 mins.
Removed, washed, raised to dull red heat in muffle, which causes the cornet to shrink & assume yellow colour of gold. Weigh.
(b) Old method in "parting" flasks.
Boil the cornet for 10 minutes in acid (s.g. 1.2) fill up with hot water & decant. Boil the cornet again in acid (s.g. 1.3) for 15 min: do do.
wash. Place in porous crucible. Anneal at a red heat. Weigh.

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4th " "	Mr Swift.
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2d do & Ass Assayer	Mr Sterry.
3d do.	Mr Aberdein
4th do	Mr J.R. Brande. (whose father W.T. Brande in ? Coining Dept.)
5th do.	Mr Finch
Office Keeper	Mr Pearson
Housekeeper	Mrs Caulfield.
1st Messenger	B. Anderson
2d do.	W. Lalor.
3d do	H. Elledge.
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Mr Capes retires 31 July 1851.

[1851 Report by JTWH. cont'd.]

Establishment of Mint Office consists of:

Mr Barton — Comptroller
Mr Forbes, Mr Hill, — Senior Clerks
Mr Marshall — Senr. Cl & Melter
Mr Buckle — Senr. Cl & Assist. Coiner
Mr Cumberland, Mr Sufft. — Junr. Clerks.
Mr Storey — Junr. Cl. & Asst to assayer.
Mr J. Pearson — Office-keeper
Mrs Dobbyn — Housekeeper
J. Taylor, B. Anderson, W. Lalor, — Messengers.
W. Ward J. Bradley, Noah Moore, Jos. Haley Ed. Cook — Packers & Tellers.
Mr Field — Resident-Assayer. (Master's Office) was formerly in Queen's Assay Office [JTWH. interview at Testimonial Oct/59]
Geo. Busher. — Foreman to Assay-office.
Professor Miller of King's College
Professor Graham of University College } Assayers to the Mint.
Mr J. Johnson
Mr E Lewis — Registrar & Accountant.

Lord John Russell's Offer of the Mastership of the Mint.

Chesham Place.

Nov 9. 1850.

Dear Sir

In making the necessary arrangements consequent upon the resignation of the Mastership of the Mint by Mr Shiel, it has been thought right to reduce the Salary to £1800 a year and to make the Office a non-political office.

This being done, I purpose to recommend to the Queen your appointment to the Office of Master of the Mint. As this office was held by Sir Isaac Newton, I deem it a fit tribute to your eminence in science & to the high reputation of your father to offer you this important office. You will find able assistance in the performance of the duties belonging to it. I remain, My dear Sir,

Your faithful Servant.

J. Russell.

Sir John Herschel Bart

MINT

Notes & extracts from documents in Hut Box (Lobby of Cottage Ch of Ex.)

1850. Nov 9. Was offered Masterships of Mint by Lord John Russell.

1850 Nov 17. J.F.W.H. accepted the offer.

1850 Nov 21. Lord J. Russell's acknowledgment thereof & statement that the Salary wd amount to £1800 including residence allowance.

1850 Nov 29. Sir Chas E. Trevelyan agreed that J.F.W.H could deposit £10000 Stock & give his own Bond for £10000 on accepting the appointment

G.E.R. (Assistant of Treasury, deputising for Sir Ch. Wood)

1851 Nov. 24 Sir Ch Wood (Exchequer) says there is a talk of having a Mint in N.S. Wales. a That the U.S.A. has sent a Mint establishment to California. J.F.W.H agst coining old dollars. Nov 4. J.F.W.H to Sir C.W. says a large consignment of copper bought from Russia was 3 guineas per ton & of Swedish currency bearing impress of Chas XII

1851 (Early in year) Sir C. Wood delighted with his visit to Mint etc. Aug: He is delighted with Sir J.'s plate new coins.

1852. Long correspondence with Ld Chancellor (Treasury) about the emoluments of Mr Pistrucci

1852 July 28. Skiff memo. to L^d Aberdeen about duties of Master & need of a Deputy. [He had had no Deputy for 5 mos]

1853. May 28. J.F.W.H. Resigned (for the first time)

1853. Mr Jelyman's true provision to Mint. Feb 14 (A Report on the method & possibilities of peculation.)

1853. July 23. Letter re Capt Harmer's retirement (Shows how greatly Sir I. was annoyed without a Deputy for 5 months in 1852.

1853. Aug. Off of Dep. M. abolished.

1855 Feb 21. Memorial (with Schemes) by Brande & Finch re their pay.

(1)

Re Appointment
to print
(Part of the minute - it's occurring) ....

Jan 31/1855.

Carry Caro

Thankyou for your little billet, it opens daylight and something like a future to me, even here in the flesh.

Some years ago when a little wee-blue-diabled about worldly matters I talked to my good old and now lost friend Jones about them.

I asked him if he thought there were any positions in the Public Service he thought I could apply for.

His answer was — rough & strong & to the point.

"I had rather see you in your grave!!"

Soon after he added - 'the only thing fit for you is the Mastership of the Mint. But that is a Political ~~offices~~ office.

Judge of my amazement and how I was taken aback when one fine morning — in drops a letter from Lord Aberdeen, to say he had recommended me to H.M. for that very office.

During my 4 years tenure of office (how little this sort of thing seems - to the huge affairs that are now agitating men's minds). The work performed has been at the very least [much erased]...

It has been also very far better done than there has ever been

(2)

any single instance of — and the country has been saved somewhere about £90,000, so I do not think I shall retire in disgrace.

Yet as far as I am myself concerned — I had better have lain 4 years in my grave or in a trance.

Thank God I have yet faith in myself and that a few months of that blessed S. East Kent air and family life and human intercourse & congenial pursuits will set me a-going again. — but oh! how my whole soul does gasp for it!

Adieu.

The above is reply to the following from his daughter Caroline Hamilton-Gordon (per her husband Alex[r]. on a little half sheet:

Two words only to say. Lord A. spoke about you last night and said he must do something about accepting your resignation, but he must lay it before the Queen first. I begged him to do it quickly before he went out finally himself.

(endorsed by JTWH. Rec[d] Jan 31/55 per Alex[r] in evening.)

1852. Feb 4 To W.H. Miller (Millar Prof. K's Coll. assayer & Mint). .. We have not in the Mint any balance competent to the work you describe. That which I have been trying, belonging to the late Queen's Assayer, Mr Bingley, & which served for the comparison of the standards in 1752 is very far indeed from possessing the delicacy you require & will not safely carry more than one or at the utmost 2 pounds in each scale. I think however it would be desirable that there should be in the Mint a balance of extreme delicacy as applicable to considerable weights ...

1852. Mar 15. To W.H. Miller. P.S. The Bank is proposing to adopt a decimal division of the Troy ounce in all their bullion accounts & we at the Mint propose the same thing, rejecting henceforward Troy Pounds & Penny weights & grains. Now for this we must have new weights & as it would be a pity to have them all to alter, after the new standard is legalized, would it be asking too much to request you to acquire, in conformity with your P.S. a set of say 10 D, 10 & 0·1 D to be furnished you for the purpose to serve as generators of the totality of weights to be used in both establishments?

1852 Apr 23 R. Grant ... allow me to remark that the undulating [sic?] theory of light is irreconcilable with the communication of any degree of pressure motion to a mass of matter transmitting, reflecting, or absorbing the luminous waves & therefore that to make Kepler's view of impacti available it is necessary to reject absolutely the undulating [sic] theory of light & adopt the molecular.

1852. Apr 28 To Lassell [About Malta & his big telescope]

1852 May 15. To Miss Horner (re Miss Oersted & her father ? 1846 Brit: Ass.)

1852. May 19. To A.C. Peterson (re project to do away with the Observatory at Altona) ... An Astron! Obs! known throughout the world as one of the great zero-points of Geographical reference ... ought to give it a sanctity in the eyes of the public. ... It is easier to destroy than reconstruct.

1852 Aug 28 De Morgan. ... except in the interval from 6 a.m to 9 a.m I never have a moment I can call my own & that is usually pretty well occupied. I am as much cut off from existence, other than that which, in this age sets all other existences going, as if I lived in another planet. I believe there is such a thing as Science and I am told England has still a literature - but except that your note and one of Hind's shews me that the scientific race is not extinct, the one and the other are matters of deep-rooted faith in the one case, and of hearsay credence in the other.
cupsid. ... Lady H. is ill at Hawkhurst & I cannot go to her. Our Cambridge Report will be signed on Monday!

1852. Oct 30. To Dean of Ely (Peacock) [Asking him to "marry" daughter Caroline.]

1852 Nov 10. To Faraday. Wolf's letter excites great expectations. A law of periodicity in the recurrence of the solar spots seems to be established by Schwabe's observations ... & the period agrees with Wolff, Sabine ... has .. distinctly connected the two Phenomena, extraordinary magnetic disturbances & great Solar spots by their identity of period. If all this be not premature we stand on the verge of a vast cosmical discovery such as nothing hitherto imagined can compare with. Confer with what I have said (Astr: note on Art 400) Query, the red clouds seen in Solar eclipses, are they not reposing auroral masses.

Confer what I have said about the exciting cause of the Solar 'Light', reference it to cosmical electric currents traversing space & finding in the upper regions of the Sun's atmosphere matter in a fit state of tenuity to be auroralized by them. (astron: note on Art 400).

see Vol VII p44

TO G.B. AIRY. 53.2.9.

It is only too true our poor little Amelia has had a very narrow escape of being burned to death and has only escaped with a terrible amount of excoriation on the arms, not back, and face - though thanks to good nursing I trust she will not be (at least to any disfiguring extent) permanently marked by it. Her left arm in particular from the wrist to the shoulder has been completely flayed. It was in enacting a Tableau when the cloud caught fire and she (very bravely) tried to pull them down and extinguish them.

1853. Apl 11. To Dr Morgan (about coins a coinage) .. I wish to gain all the information I can as to the History of the introduction of the Decimal scales into ordinary use in the several nations where they are legalized....

1853 May 14. To Fox Talbot. .. I beg to thank you for your delicate & admirably executed specimens of Photographic Engraving. ....

1853. May 17 To Struve. ... My present position is one which altogether cuts me off from any participation in the active pursuit of Science such as I see is going on in all its departments ... but I look forward to a period when I shall be enabled to resume, if not active observation at least a higher degree of participation in the great intellectual movement which accompanies the practical improvements of these later times.

1853 May 20. Mrs Somerville ... Alas! I have now for a long time been able to do nothing whatever of a scientific kind. But the world does not therefore stand still and the last has been an eventful year for me & my family in the marriage of a daughter & the launching a Son on the "wide wide world."

It seems an eventful world to all the world in another and a strange sense. I mean this wild unaccountable epidemic outbreak of delusion about the turning tables! A new power it seems is discovered a power in will to dispense with effort - or as some call it the power of expectant attention or as others - of the electro-biological current which they say oozes out from the finger ends and sets the tables and chairs in motion. At first Cherry tree and Rosewood were the only tables that would turn. Now however, they are less fastidious and Mahogany dances like the rest. Learned and ignorant - Lay and Clergy - Bishops, Priests and Deacons all alike give in their adhesion. And it is the most unpopular thing to have (at least to express) a doubt. Oh! for a few grains of common sense or sound philosophy, such a certain Lady would scatter abroad among the "Beasts of the People" were she here! Sometimes I say to myself "qui vult decipe &c." but it creates a most melancholy sense of the weakness of poor human nature to see al this going on and spreading.

1853 April ?? To Dr Morgan. .. I found on "rummaging over the collection of Music documents & the very meagre assortment of monetary literature it contains, a good deal of that sort of matter .. but (shame to say) almost every thing of Newton's has evanished.

1853. June 9. To C. Pritchard (& Schoolmaster.) Johnny tells me "the tables" have had a great "run" in school & many boys are believing ... (Long letter on table turning which she- (he supposed.)

1853. June 18. To Donaldson. ... A Professorship of Music providing for the teaching of Music as a Scientific art. ... Such a thing is very much wanted.

[Excellent long letter on Sound & music & £60,000.]

1853. July 21. To J.R. Hind. I have faith in my idea of equinoctial tuning

[see letter in early "forties."]

1853. Sept 9. Miss Lipscomb ... I enjoyed myself very much for 3 days I passed lately at Hawkhurst but alas! they flitted by all too rapidly. ...

1853 Nov – To Whewell (re Plurality of Worlds.) ... which by the bye, people very oddly persist in attributing to yourself. ... So this then is the best of all possible worlds the ne plus ultra between which & the 7th heaven there is nothing intermediate. Oh dear! Oh dear! 'Tis a sad cutting down Look only at the Russians & the Turks. Look at the Revelations of the Blue Books & the Police Courts. I can't give in my adhesion to the doctrine that between this & the angelic there are not some dozen or two grades of intellectual & moral creatures. ... However no matter. The book is full of striking things .... My family are all in the country. My own existence is limited now to the one & only idea of making money & getting through the daily duties which allow no moment for any intellectual pursuit whatever. – .

1853 Nov 9. Lord Rosse. There is no serving God & Mammon. For me to undertake the task you propose to devolve on me .. is simply impracticable. There is no man living who could write a memoir of Arago without much reading & preparation & much earnest & consecutive thought. Half the Science of the 19th Cent: is interwoven with it. ... But any such thing as time & thought consecutively bestowed on any scientific or literary digest is what the duties of my mammonism, such as I find them, will not allow me to dream of.

1854 Jan 27. To Miss Cornwallis. .. I am so thoroughly worn down with all that is going on in science that I really can give you no suggestion as to what Books contain the newest things in either Geology or organic chemistry ... and as to being able even to visit a Library – I am as utterly cut off from such a possibility as if I lived in Lapland ... One thing I will mention ↓

.. You can hardly avoid noting Liebig's researches (on organic chemistry) but in his theoretical application of their results to the conditions of human life in various climates he has made a most fundamental blunder which has never been so far as I know, noticed.

He says that in cold climates a man inhales at a single inspiration a greater quantity of air than the same man in a hot climate, because, volume for volume, cold air is denser & heavier than hot. Ergo, he takes in more oxygen, ergo, he requires more combustible food. Ergo his lamps of life burns faster & he requires to be fed with train oil whereas in hot climates chopped straw or rice is quite fuel enough for a man to shine out in glory upon. He forgets that the air has to go through the nose, mouth & windpipe into the warm lungs & that the temperature at which it fills the lungs is strictly the same whatever be the external cold or heat. ..... If Liebig's views be just the Mexicans ought to live on sawdust, I mean the citizens of Mexico itself at 8000 ft.

1854 Nov 4 To H.A Jeffreys. … I consider the instruction of the lower orders a high & honourable object & well worthy of exertion. But everything does not fall to the lot of all men … although I have never delivered a lecture in my life, and to address a mixed audience is a thing quite out of my line and one which I could not undertake without more preparation than I have the time to give to it.

1854 ? Mar 15 or 22? De Morgan. … I go daily to & fro in Omnibuses, and as it was my habit while in Harley Street (dating today from 35 Bedford Place) to go by a 4d. omnibus via Charing Cross I almost daily had to take coppers. At that period I had not taken altogether I may safely say half a dozen of the new half pence. … The fact is that they get abroad in batches … .

* Thanks for your congratulations. I don't feel much older or much younger in consequence of the event - but certainly somehow I do begin to feel that I belong to a former generation. As to an outward and visible badge - though I cannot boast of Gout, Rheumatism and Lumbago, which now and then effectually prevent erectness of carriage - may serve every purpose.

1854 Mar 15 To J. Romilly. (Re Universities Commiss") … What the Commissioners have aimed at throughout … is to widen & render more comprehensive the field of University Study & not to narrow & restrict it. ["Induction on which the axioms of the Science of Law are raised."] for m. & H.

1854 Mar 2. To Mrs Gordon. … Alas! My dear Mrs Gordon I cannot but write, though the words I write may never reach my poor friend's ears … Oh! how all the long course of our mutual regard comes over my remembrance from the days of School & College and in after life, often & long separated & yet at every approach drawn together by those strong early links that seemed to gain a meaning & a power as time went on. … Thank God he is free from actual pain & that he has been able to throw himself on the love & mercy of the Being who never forsakes those whom He deeply tries.

1854 Mar 11. Sedgwick. … I don't know whether to pity your condition or not, assuredly you have a power of extracting mirth out of misery …. I wish I could turn round upon the fond friends of Tracheitis or Bronchitis or by whatever other odious name he rejoices to be known & make mock of him as you do. For a good while, I, like yourself, have gone about coughing, spluttering, & being in all things a walking mussaica to friends & acquaintance. … Whewell's Book is clever but wrong etc … .

1854 May 22 Sabrina. …I have just rec'd a Notice for the 27th of a Rent Committee. I am sorry to say I cannot attend. … It is quite out of my power for me to consider myself as one of a "real working Committee" in respect of the affairs of that Office if by a working Committee is understood any amount of personal attendance at meetings.

June
54.6.2..59.

TO MRS. JONES.

We have brought out the Florin at last and here it is. You will observe that Her Majesty is duly reinstated in all her titles and epithets. It is only a pity that the issue is not nearly large enough to bring it into general circulation.

De Morgan. Nov 2./54

Alas! I fear I shall never more look in Book (save and except my weekly novel with which I read myself nightly to sleep). Still the case may turn up. It is Chemical Books I now most affect after Jack the Giant Killer and the Revue des deux Mondes. Here is Warburton's equation … I shd. really like to be enlightened about it.

1854 Nov 2. De Morgan … between the hours of 10 & 6 there is but a slender chance of my ever being caught in my den (= 35 Bedf: Place.)

1854 Oct 28. To Whewell (re his son Alex: to go to Trinity.) (good epitome) left Trinity 1859.

1854 Nov 6. To De Morgan. I stand corrected! … I had an inkling it might reduce by some trigonometrical quirk, but precisely fought that very transformation which, as you say, would have run full butt against any body whose hand was in. And so I stand corrected! … .

1855. Jan 13. Mr Jones. This is sad news indeed which your letter communicates & I would that it were in my power to come down to see my dear suffering friend at such a juncture but alas! I am

I am myself rendered incapable of travelling by an ugly attack in one of my limbs which has just obliged me to put myself into the Doctors hands - and though necessitated (under circumstances admitting of no escape) to go down to the Mint daily that journey and the necessary standing while there, does me so much harm that I dread to increase the evil which is becoming very threatening by any extra amount of travel.

Death of Jones.

1855 April 7. Peacock ... I have been applied to by the Dr. Chancellor to act as one of the Commissioners in the new Cambridge Commission, but have been compelled by the state of my health to decline the proposition ...

1855 July 2. W. H Smyth — In a P.S to letter from Isabella Herschel, Very dear Sir If these are the last words I shall write as I feel it to be very possible they may be, I beg you to receive my best thanks for your kind expressions in my behalf & for your steady & continued regard for me. ....

1855 Aug 6 Dr Hutton It is impossible for me to express to you the painful shock which our friend Sheepshanks sudden departure has given me. This is indeed a most grievous loss both in point of power & readiness to use it with an utter disregard of selfish considerations. No man gave himself more entirely and unreservedly to Science & to his friends & he has left a void which will not be easily filled in that department of work to which he devoted himself.

Thank you for the considerate way in which you have communicated this sad intelligence. It finds me - sobered indeed - but not so much weakened as I might have expected by 5 months confinement to a sick-bed, and in a state of great suffering. I am just beginning to learn to walk on 3 legs (2 wooden) and have got the length of my room - but something whispers me I am not yet out of the wood - so I wont halloah yet.

... I have taken on myself the reply to your note which I can now do, not indeed without awkwardness but with a less painful effort than hitherto ....

1855 Sep 26. To W. De la Rue. ... Should I ever be able to get about again, I should die content could I see Saturn through your 13 in Equatorial Newton's reflector in ~~such a style~~ ... but, alas!, the ring is closing up & I can hardly hope to be able to quit my wheel chair by the next opposition.

1855. Nov 6. De Morgan. ... I am not progressing quite as fast as I could wish, as you will see by my not writing myself, but I hope the best. ...

1855 Nov 15. A Bracket. ... being confined to my bed by long & severe illness, I hope you will excuse my not entering at greater length into the subject, the act of writing being both painful & difficult to me.

1855 Dec 5... De Morgan. ... I am still in a very stationable way of progress & "Alps over Alps" seem to peep upon my onward path. Whether I am destined ever to reach a culminating point, God only knows, all I know is that what He sends is welcome.

1855 Dec 12. De Morgan ... I have been for some time past so unwell and in such a dreamy state of no-how-ness, that I have let your query about the note pass away in mist & vapour. To day I feel a great restoration & the things of this world come back & among the rest your note.... As to "processerit" I feel always qualmish at putting anything but a subjunctive mood after a word beginning with "quo" ... I console myself with the reflection that I once acquiesced in the spelling of "appretiation" with a c (horresco referens) & "sympathize" instead of

1856 Feb 11. Sedgwick. ... I am now almost in a whole skin through unable yet to put foot to ground ....

1856 Feb 13. Col. Gordon (sm in law with H.) .. There never was anything so unfair & unjust as the unanimad versions of the Times in wanting to fix on you the blame of the Crimean disasters. If Airey & yourself had been Angels from Heaven you could not have made head against the broad fact of the better want of means to transport the Stores from Balaclava to the scene of action. ... nil nisi bonum, I cannot exonerate Lord Raglan from this huge responsibility ....

1856 Mar 19 Lubbock. (In support of Major Stevenson's applic^n as Commandant of the Constabulary Dep^t about to be established in Kent.)

1856 Apr 24 To Capt. E.M. Ward R.A. I have been so insulated from every description of business or general intercourse during the long & painful illness that has held me confined since the beginning of March last year (& from which I am not yet so far recovered as to be able to walk on crutches, or even to stand upright without support, that I have nothing to report except perhaps that it does not seem quite absurd to suppose that Aluminium may prove available as a metal for coinage for an intermedium between gold and silver a token coinage for values of 2s, 5s and 10s for it appears that it can already be supplied at 60s per oz. and from its specific gravity (which renders its counterfeiting impossible)* it will go as far in bulk as 8 times its weight in gold, so that a coin of it the size of a sovereign at its present price would be intrinsically worth 1s10d, and as its price is sure to fall, it would never become worth while to melt down the tokens. That it can ever become very much more abundant (as much for instance as Copper), I greatly doubt to say nothing of what has lately been talked about, its replacing Iron for roofs and pots and pans &c.

... We are all in the midst of peace celebrations, naval reviews & rejoicings but I think the people generally "rejoice as though they rejoiced not" ... there seems a feeling that the Russians have not been quite licked enough & that the Emperor only "s'incline pour mieux sauter". However we can only pray God to misfire him with better thoughts than foreign aggression. Meanwhile there is but one opinion about the other Emperor (our next door neighbour) and that a most favourable one.

1856. May 5. To B. Osborne [Admiralty?]
re Suggestions for carrying out the projected Astronomical Exped^n to Teneriffe by Prof. Smyth. (see my Extracts from Piazzi Smyth's "An Astron^l Experiment".)

1856 May 7. Sedgwick. ... We are all going on pretty well (though I don't quite like the state of weakness & bodily prostration of Lady H. after weaning the baby) [More of a family nature. Nuptials to be added. ?]

May 19. 56. Dr Forbes Winslow.
In reply to them I may certainly say that thank God I am I believe, cured of the original evil and am now, and have been for some considerable time past, in a whole skin. But I have been so cut and hacked about that I have now to recover from the cure and to judge of the progress made in the last 3 months in that respect, I see very little to lead me to expect that I shall be ever able to walk again, I mean, without wooden appliances, accordingly I have got a couple of Shores or props which I have christened Scheuel and Grattel, (you are a German scholar I think) and which will I suppose be my faithful companions to the end of the story.

1856 July 14. G.G. Stokes ... magnetism. [Refers to his lastly done experiments of 14 Mar 1823 at London Institution.]

1856 July 27. J. Tyndall. ... in the manufacture of the Coin of the Realm. One part of the Process consists in "Ringing" each piece of gold or silver coin (after receiving the impression) every piece which will not ring on dashing it against a stone is rejected & remelted. and such are numerous. Now the cause of this can be no other than minute air-blebs in the Bars out of which the Lamminæ of metal are rolled. by a flatting mill, each bleb being flattened out into an infinitesimally thin film of air parallel to the faces of the coin & so producing a solution of continuity & of course destroying the harmonic vibration. [About contraction of skate. J.W.H's view.]

1856. Aug 2. To Greg. [re Mrs Somerville's M.S. J.W.H. confesses he is behind the times]

1856. Sep. 11. W. H. Smyth → I look on the Actinometer now as a perfect instrument

→ I see there is a certain Prof. Stoney (?) who at the B. Ass^n^ meeting appropriated as his own & without once mentioning my name or my habitual use of it in my sweeps since 1832 my collimating telescope as applied to fix & verify the adjustments of a large heavy metallic Speculum on its bed. I described this in my paper on Nebulæ Phil Trans. 1833 & again in full detail in my Cape Observations but I fear the utmost publicity & insisting on a thing will not secure one from the re-inventive genius of the age. Prof. S. has however overlooked one of the best applications of our internal Collimator (which though I always knew, I did not use ...) viz to throw aside the eye piece wires altogether & work to the image of the Collimating wires. This nullifies altogether the effect of the mirror wobbling about. ...

1856. Sep 12. De Morgan (facetiæ &c) I cannot say I remember any peculiar way or frequency of rubbing his hands which distinguished Davy but I am far from bearing any testimony to the contrary. He might have rubbed his hands 20 times in the hour & I not have noticed it as I am a little obtuse in remarking the personal habits of people.

1856. Nov 11. To De Morgan. ... I am progressing. I can get on in the early hours of the day without crutches though in a grumbling way ... Towards evening however I get horribly stiff & I am always haunted by dreams that I am half made of sticks. N'importe, I shall shine forth some of these days. I am about Colour-blindness; will you (at your leisure) tell me how many persons in the number of your speaking acquaintance cannot tell scarlet from green? ... Of all things which show up in a wonderful way .. "so many men so many minds". the oddest is that there should be 2 opinions about the basis of a decimal coinage. I am reading your lecture (as all money matters ought to be read) with interest, but if you get a decimal coinage within the next century you may eat me, though by the time it happens I shall be horribly tough.

1856. —? Sedgwick. ... I am sorry to hear such a continued bad account of your personal state, but I rather fancy you have a taste for describing yourself in such characters as "a monster unto many" & as "slimy" & other mei epithets. Still there is no smoke without fire. We all grieve to hear of your sisters illness but I trust she may yet be spared to you. ... As to myself I have had two or three severe smubs when I thought myself on the mend & immediately on our return from Arneiss I was prostrated with a more severe attack when I thought myself rapidly getting into a whole skin ... I have been hacked & hewn almost into mince-meat, so that with pepper & salt & a good grilling my limbs might do for a "devil".

1857. Jan 14. J.D. Forbes. ... I was sadly disappointed by the failure of P. Smyth's actinometric Obs^ns on Teneriffe. ...

1857. Jan 16. Col. Sykes. ... All that the barometer can show is the total vertical incumbent weight of this ... includes the weight of visible cloud or fog may, even of dust or of falling rain at least such drops as have attained their max: velocity. [I shd- observe .. that in certain states of atmospheric disturbance I am by no means clear that this is rigorously true. It only measures the weight suffered]

1857 Mar 15. Sabine (Quarrel) ... I am much improved in general health but all active occupation is at an end with me. However I can manage to prune trees or transplant bulbs. ...

1857. Apl 1. Dr Morgan ... I am now at work on a little article on Meteorology (Neural?) (Letter to Baily by J.F.W.H. Mar 1./37. (see back.)) .. I may add that the idea of electric currents (cosmical electricity) affecting the Sun's phosphorescent activity had been always hankering in my mind and that I have always attributed the Aurora to external action of this kind.

1857. Apl 12. I need not say how delighted we shall be to see you here .. I suppose I am fixed pretty effectually for good, ... How I shall enjoy the sort of chit-chat you refer to, de omni scibile as in the good old times when thought was on the wing & all directions seemed equally open to its excursions. Well, and is it not so now? ?Casimir? ... I was grieved to hear from Mrs Peacock that the dear Dean is so ill at Hastings that they are only anxious to get back to Ely. Her is very weak & his attacks are becoming more frequent. ... What a queer book that is of Herbert Spencer.

1857 Apl 16. Airy. .. I am much better & though I have a misgiving I shall never be able to walk again, yet I feel tolerably reassured as to the original cause of the complaint being extirpated. ...

1857. May 6. To W. De la Rue. .. What a very beautiful "Picture book" is there days of Picture books, a thoroughly well-executed & scientifically conceived series of Representations of Astronomical Objects, such as have really been seen & stripped of their all meretricious or exaggerated features, ad captandum, would make. Such a work would have a world-wide circulation.

1857 May 23. Whewell. ... Hind & Bishop are delighted with your name Eurene (rudy. Irene) for the new planet & it will be so Christened on Heathering[illegible] forthwith.

1857. June. 10. De Morgan. When does a bonnet cease to be a bonnet? When it becomes a young lady?. Why is a highly polished reflector like a pretty girl? Because it is a good workin-g-lass.! [Mrs]

1857. Sep 17. Whewell [Evidently re Louisa Herschel's engagement to Mr Reginald Marshall] What you say is certainly very satisfactory. Most necessary. I wish there had been a longer acquaintance Mr M. is coming here soon. I wish I could have first made his acquaintance as an indifferent person. ..

M. Foucault called here on his way to Paris. He showed me a pretty little reflector of Electrosilvered glass which with about 4 in. aperture and some 2 feet focus bore 200 very satisfactorily. It is not a thing to be pooh-poohed as the Dublin meeting seemed disposed to do.

.. We are all tolerable here but the news from India is a terrible upsetting blown on the nerves.

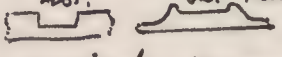
P Smyth's Teneriffe Baron measurement Old health Natural Phenomena p.1. Aurora & cosmic electricity Vol I. p7. Sabine & Quarrel Foucault H Spencer Old health Surface Illustrated picture book New Planet Eurene Rev Sabine & Herschel engagement Foucault Indian W.J.H.

1857 Oct 8. De Morgan .. comfortable news from India, so far that Willy is safe & has plenty of hard work through with a very reasonable probability of having to fight for his life.

To Lassell (at Malta) Oct 21. 1857

I wish your telescope stood under our bright and pellucid sky here in Kent. You would not find it inferior to Malta except perhaps for definition, though such is the tranquillity of the air in our calm nights that I should expect anything and everything from it.

1857. Oct 24 Lloyd. I entreat you not to put me in the Chair of the proposed Magnetic Conference Committee when I shall be utterly inefficient as I shall not be able to attend any of the Meetings ... I do not want to be put into a position of prominence which I should not be personally able to justify.

1857. Nov 1. Lassell. I hope you mean to use a collimator interior to your telescope. [Instead of depressions have projecting cups. ]

1857 Nov 8 Admiral Smyth. ... so the great Leviathan is struck. My own notion is that the mode of Launching adopted is one of the most imminent danger & costly to a dreadful degree. I & P. have been for digging a canal sloping to the side of the ship & then partly digging & partly washing (by Steam pumps) the ground from under her till she floated & then hauling her into the main stream. What think you of this scheme? [Twin tug-em to launch the Ship!! 3 Nov to 31 Jan 58]

1857 Nov 21. Smyth ... Had the Times condescended to insert a letter of mine signed "Verbum Sapt." duly accompanied with name & address (temporem citra) which I sent them the day after I wrote to you ... Brunel or any body else might have had an opportunity of seeing & judging of my notion of washing her into the main. But Dis aliter visum. ... Au reste, Brunel is an obstinate man (which means a man who won't flinch from going through with what he has begun on) & it is not expence (to be paid by other people) that will frighten him. Nothing but a physical impossibility (or some horrible accident) will make him alter his procedure that you may be sure.

1858 Jan 20 Mrs Somerville. ... continued illness, from which it has at last pleased God to grant me a restoration I never at one time expected & which rendered ... the act of writing peculiarly irksome not to say physically painful. However ... I have just sent an Article on Meteorology to the Encyclop: Brit: in which inter alia there is a new "Envisagement" ... of the Barometric measurement of heights, & some views relative to Laplace's formula & the conditions of the relation of temperature to density &c involves (implicitly) which I believe now to be first propounded. One of the results of the enquiry entered into (from Balloon ascents) is a determination of the "Temp: of the Celestial Spaces" which comes out at minus 239° F. agreeing wonderfully with Pouillet's though grounded on a totally different system of reasoning.

1858 Jan 30. Whewell. ... Have you any "views" generally in the matter of future Magnetic Observations? It strikes me now that a good deal of the existing machinery may be in great measure dispensed with & that what we now need is in the nature of Magnetic Surveys with a few fixed establishments to keep up connexion between the past & future.

1858 Feb 6. Sabine. [Accepts Chairmanship. Chemical Section Brit Ass. at Leeds.]

.. I have rec[d] a notice that the R.S have appointed me with Airy Whewell, Peacock .. to act as a Com[tee] to co-op: with Brit: Ass: for forwarding the continuance of the observations on Terrestial Magnetism. (Please send your views.)

1858 Feb 28 Mrs Somerville .. Your 2[nd] Edition of Physical Geography .. only I must remark on one passage (p. 5.) You state that Airy's determination of the Earth's dimensions was 10 years later than Bessel's, whereas it was 10 years earlier, and the error is of [in] more importance as Humboldt has stated in his Kosmos the result as Bessel's, ignoring altogether Airy's prior fixation of the very same all but identical dimensions. I did my best in my Review of Kosmos to rectify this injustice (which is part & parcel of the good old Baron's Anglophobia) by a sly slap delivered in all good-nature, but in vain. The 4[th] Vol of Kosmos has appeared & the offence is repeated.

WJH Dec

Clear Horsforth

Sir J. Clerk, Bart. Magnetic Col (see Balfour Stew) Collimat

Lassell's Leviathan

Letter to Travers

Whitehall

Art for Encycl Brit Sept 14th 16

Magnetic Stations for Surveys

Chair of B A Chemical Sec[n] Coll[e] Leeds 1858

Earth's dimensions Humboldt Kosmos

An Eye-witness' Account of Donati's Comet 1858

At this interval of time the number of surviving witnesses of the great comet of 1858 must be very small indeed, a fact which lends great interest to a note which appeared in *Church News* for 1939 May, and which is reproduced by kind permission of *Home Words*. A Mr. C. Purser writes: "Mr. Eric Hardy's fascinating article on the stars brought to my mind a glorious spectacle I was privileged to see when I was 5 years old. One night my father took me outside our house to see the stars. The street was crowded with people. But I noticed they were all very quiet: some women were weeping. They said the end of the world was about to take place! My father drew my attention to a point in the sky where I saw a brilliant star which differed from all the rest in having a long sweeping tail which appeared to me to touch the top of a range of hills contiguous to Dudley Castle. Next night half of the tail had disappeared; the night after it had vanished altogether. It was the celebrated Donati comet of 1858 which I was privileged to see; but as the astronomers tell us it only appears once in every 2500 years I don't suppose I shall see it again. I remember this wonderful event more vividly than any other incident in my rather lengthy life of 85 years!"—C. M. B.

from observed dates of maxima and minima between 1856 and 1933 and earlier dates computed. Similarly a curve is constructed by projecting forward from the minimum of 1798 and compared, as regards times and intensities, with the curve of observed maxima and minima between 1880 and 1939.

In the opinion of the writer of this note the agreement shown between observed and computed data is, unfortunately, not very satisfactory.

The second monograph is entitled "Utilizing Heat from the Sun," by C. G. Abbot. In this Dr. Abbot describes very fully various ingenious devices for cooking, distilling, heating, pumping and even for power purposes. It is to be feared, however, that such devices are destined to remain little more than toys. Direct solar heat, like tidal energy, although enormous in the aggregate, cannot be advantageously trapped in bulk on account of its even distribution, and mankind will, no doubt, prefer to rely on the *indirect* but more concentrated *results* of solar radiation such as coal, oil and waterfalls, and, perhaps, alcohol, from vegetation, when *they* are exhausted.

F. J. S.

1858. Feb— TO A. De MORGAN. (JFWH was Chairman Chemical Sec B. Ass.

In re Monday versus Tuesday, you have not exercised your usual acumen. Of course Monday begins on every Meridian - the question is on what Meridian it first begins. Suppose all the people all over the world did nothing but shout at the top of their voices the day of the week, all day and all night long. On what meridian would the word Monday first being to be uttered? That is what puzzles me. Also - how many different days of the week are current on the globe at once? Can it be Sunday in one place, Monday in another, and Tuesday in a third? I suppose not but I should like to be sure and as it is clearly beyond my reasoning faculties (for I have got my brain into a complete muddle about it) I really should be glad of your decision. I don't know whether this can be read for I am obliged to write with one eye, having poked the right one almost out with a stick - happily not a very large or a very pointed one, but enough to lacerate the conjunctiva & make me look very horrid & feel very bothered.

1858 Mar 21. R. Grant. .. In reference to Arago's works which yourself & Adl Smyth have in hand (Lectures). I can only say that anything more astounding than several parts of it, I have never seen. For instance he affirms that the phases of the Moon depend for their explanation on the fact that the Moon keeps always the same face to the Earth.

1858 Mar.... De Morgan. [Lighter vein. Typical of his fatiguid condition in '58.]

1858 Apl 10. R. Fitzroy .... [About Maury.]

1858 Apl 28 Sabine. ... I am glad you had rescued poor dear Foster's results from the bane of Humboldt's silence (his silence is eloquent, it was a good while before I understood it, but now I do.)

1858 May 22. De Morgan. ... I should have thanked you before for your paper on Beats but I found it beat me. I once tried to read Smith's Harmonics, but I did not succeed & one reason (that is the flattering unction I lay to my soul) was that my copy has not got the figures referred to in it. However I am glad to find it is really a very hard book. I followed ... your Algebra I could follow out - I am getting stupid in re algebraica & your equation (the very first that occurs) broke me down, which will give you the measure of my stupidity.

1858 Aug 27th To P. F. Robertson.

[Suggesting a scheme for the drainage of London right out to sea, though he thinks it a wicked waste.

(1) Lateral iron pipes on each side of the river from highest point of London drainage system

(2) Construct on either side of the river a reservoir of water about 105 yards square with sluice gates to open to the river at high tide & to fill it in a few minutes. Each reservoir sh. have a sluice gate opening into the Sewage Channel, to be opened between tides

(3) The Sewage Channel pipes to be carried quite out to the mouth of the river so as not to pond the water running up from the sea.

"It would be best to restrict this mode of drainage to the street washings & general sewage, but that for the guano to be so wasted is sinful & a sin and a shame & a very small expenditure of mechanical ingenuity would suffice to devise some perfectly inexceptionable plan for boxing up this & conveying it off into the country by barges up & down stream"

1858. Sep 12 DeMorgan. ... Poor old Newton! So he is proved to have had his weaknesses & his failings like other mortals! Well, he is gone to his account and when his ghost & Leibnitz's meet in heaven I suppose they will shake hands & make it up - at least I hope so for both their sakes - but how comes it that you have taken up this point of research in such vigour, Are you going to publish a life of him? or has anything riled you?

1858 Sep 15 Sept Smyth [Evidently referring to his own hastily corrected proof]

1858 Sep 15 Lassell. [Same, but long & explicit. Shows his mental fatigue.]

1858 Oct 10. W. DelaRue. ... The small Stereoscopic (photographs) of the moon, I hasten to testify my admiration of their transcendent and wonderful effect. It is a step in nature, but beyond human nature, as if a giant with eyes some thousands of miles apart looked at the Moon through a binocular.

1858 Oct 18. DeMorgan. ... Here is a Rev Mr Beresford writes to request that I will (in conjunction with Lord Rosse & Mr Hind) "assist" him in Lecturing the Public at Exeter Hall about the Comet while it is "yet" blazing in the western sky" being an excellent occasion to lead the thoughts of the vulgar from Nature up to etc. — Poor dear Comet. I fancy I have seen the last of him this evening looking thin & pale & meagre like a shotten herring ...

1858 Oct 19. Whewell ... I don't lay much stress on any thing I said, in my inaugural address at the Brit: Ass:. The fact is I was hard enough put to it to say something that should not be absolute nonsense. If however you have clear ideas in re capillary attraction & can in ½ page convey me a satisfactory notion why the liquid stands at a higher level in a cap: tube by mere attraction to self & glass - I really shall feel much obliged. — I was obliged to go up to Town for a few days after arriving here on Friday & it about finished me. Since then I have been here, laid up with a ferocious bronchial cough & in very torpid case in other respects.

1858 Nov 19. P. R. Robinson [... I do not remember whether you took any interest in M. Foucault's silvered glass Specula which both in conception & execution struck me as very pretty.

1858 Nov 23 W. H Sykes ... I am just returned from Southampton where I have been seeing my third son off for India. and I find your letter [to Balloon Com: of R.S.] ... asking my opinion as to the expediency of renewing the balloon ascents. Now on this my opinion is very definite. By all means let them be renewed & in: with a distinct view of obtaining further data (photographic obs:ns etc) .. (more?)

1858 Dec 15. R. Brown (On musical harmony)

1859 Jan 25. Carrington. Of the general desirableness of procuring the Establishment of One Indian Royal Observatory ... I have not a doubt, but I question if it is just now the time to apply for it ...,

1859 Feb. M. Billet. ... J'ai toujours eu l'intention (et je ne l'ai pas encore abandonné) d'exécuter un resumé d'optique en allant plus loin que dans mon "traité sur la Lumière" et en suivant les avances que la fait la science depuis la publication de ce Traité.

Dictates to carry further his Treatise on Light.

I saw Newton's failings

Mental fag

Lovely photographs

Dark Comet

Pres: address

Vol VI p 25

Ill health

Foucault-

Sir H. Smyth

Years on Balloon ascents

Presents

Meeting Observers in India

1859 Mar 7. De Morgan. ... I am afraid your Logic is too hard for me. I cannot follow out abstractions as I used to do & I suppose there is some softening of the brain at the bottom of it.

1859 Mar 25 K. Johnson. ... I have been just occupied with the subject of Chartography & have arrived at a result ... a projection of 97/100 ths of the whole surface of the globe in one chart. ... I am preparing a paper for the Geographical Soc: explaining this projection. ... It strikes me you might possibly like to use the projection in question for an index chart to the part you have in hand.

1859 Mar 27. G. Brammall (Secr: of Radcliffe Obs:y.) (on behalf of Carrington of Redhill & also Jacob of East India Co as Astronomer Observer)

1859 Apr - R. Arbuthnot. [about inspiration of Genesis.]

1859 Apr 6. Jeffreys [My Father's works were all published in Phil: Trans.]

1859 May 15. De Morgan. .. I see an article in the Fridays Times about Sir W Hamilton's lectures, in which a view of Causes is attributed to him which I thought peculiarly & emphatically my own. viz: that Cause is the exertion of Will ... .

1859 July 12. De Morgan ... The plot thickens in Politics. The "man" has gone & done it. I suppose our turn will come next autumn if not this autumn.

1859 Aug 16. De Morgan. ... This hot summer has eaten in to me & within these last few days I have been flowed by a sharp touch of a semi choleraic attack which has pulled me down to a point of depression that makes me a burthen to all around me as well as to myself & a prey to the azure demons ..

1858 1859 Aug 27. P.F. Robertson. Many thanks for the Sewerage Blue Book. ... Supposing it resolved on to waste all that good material, this is the plan which I should be disposed to recommend. [Carry all sewage & rainwater in pipes alongside main rail down to the mouth.] ? What is done?

1859 Aug 27. De la Rue ... (your) 13 in silvered glass Speculum, may I ask how it performs? ... I am writing a little Article about telescopes for the Encycl: Brit:

1859 Aug 28. Miss Colling ... Yours Papers in Indian Education are very welcome. We have two sons in India. ... I cannot believe that the British rule in India will pass away without conferring some permanent moral & religious benefit on it. But the present is a strangely transitional state of things & I am not at all astonished at the apparent indecision of the rulers there as to what line to adopt in the matter of Indian conversions. ... begin with the women if you can get at them. [Also 1859 Oct 17. - alas! if matters go on much longer as they seem to be going on, in that quarter the "mission" of England in India will soon be closed.]

1859 Sep 1. Sabine. I regret to say I have been obliged to resign all idea of attending the meeting at Aberdeen (Brit Ass) What with the heat of the summer & I suppose something wrong in the general physique, I have for some time past been completely prostrated & sometimes hardly able to crawl about & this general debility has been aggravated by a pretty sharp attack of Dysenteria, or whatever it is called, which has left me in a miserably shaky state & quite unable to face such a journey & such a work at the end of it as the B. A. implies.

1859 Sep 4. Whewell. .. I am too completely abattue by this awful summer & too prostrated to venture on such a journey ....

1859 Sep. H. Lloyd. [Dublin] ... I am sorry I cannot attend the Meeting which, Prince Albert being to be the President, I would gladly have done, but I am in a very weak & delapidated condition. ... This summer has been too much for me.

Ill health

Thanks has brain-stiffening

His Projection Rough Work

Obs: Radcliffe

Of Causes

Causes

"Causes as exertion of Will" his own explanation.

Ill health

Sewerage Sep 12

Encycl Brit Sep 11, 16 19.

Observations Future Life English Universities

Ill health

Ill health

Ill health

1859 Sep 23. Lassell [Technical details for polishing 'Great Reflector.]

1859 Oct. — W. H. Fuller [Assayer at the Mint when JHWH was there.] Testimonial..

1859 ~~Oct~~ Nov 7. Bache [Bache an American a Manny dr see JHWH's Phys: Geog:]

~~1859. Nov~~ ... Thinks of my addressing you from this (37 Tavistock Place.]

1859 Nov 8. Sabine ... I gather that you have not heard of Miss Baily's death & that I occupy this house as her Legatee. (37 T. Pl.).

1859 Nov 8. De la Rue ... I have been told in terms of vast admiration of your beautiful mechanism for making envelopes - Madeira was in raptures with it. Might I be some day indulged in a sight of it in action & might I bring with me a little lad I am interested in, who has never seen any of the wonderful mechanical contrivances of the age & would I think benefit by it.

1859. Nov 9. G.C. Lewis (Testimonial for J.D. Forbes Nat. Phil: of Edin: for 27yr wants to be Principal of St Andrews in the room of Sir D. Brewster gone to Edin:)

1859 Nov 13. Sabine ... The case of Terrestial Magnetism is a peculiar one ... but once organize a system or a Board backed by Public Opinion .. & there is no limit to the extension of the plan & the consequent outlay. This may seem very different language from what I once held, but we had not then a permanent income-tax with a prospect of its being speedily doubled & we were not called on ... to equip & maintain .. half a million of riflemen by voluntary subscription in funds & person & we had not then been told by a Chancellor of the Exchequer that the Budget was becoming overwhelmed by extra calls on the Revenue for other purposes than for Government.

1859 Nov 17. T.R. Robinson (of Armagh) ... as the mere act of writing is of late become to me not simply irksome but positively painful .....

1859 Dec 5. C. May. I was quite unable to attend the R.S dinner being now utterly laid up with violent cough & cold. .... It has an ugly look, that fragment. It is blebby, has one large & internally coated gas-bubble, I don't like the sort of fracture ... I know nothing of bells but .. it does seem odd to choose, for a mass of metal .. to resist .. blows from an iron hammer a metal so far approaching in composition to brittle speculum as 7 tin to 22 Copper or, 24.14 % tin. ... I have no right to deliver an opinion but I must say I was surprised when I first heard of the composition of Big Ben! .... [Was at Tavistock Place all this time] M.A.H.

1860 (about) De Morgan ... By the way I am making a collection to be one day published as a "Memorial" to be entitled "A Century of Centuries", or "the Hundred best Specimens of the Hundred best things" such as ... Epigrams .. Puns ... Anecdotes .. Reparties, Bulls, American Wonders etc ... .

1860 Jan 8 Sir B. Brodie ... If the R.S is rich enough to afford it I should not consider £200 a year for each of the Home Secretaries & £100 for the Foreign an extravagant remuneration considering the very great amount of duty which the immense extension of Science & the number & variety of subjects brought before the Society must entail upon them & the sort of persons they must be.

Sorry JE

60.2.3

Have you not been a **Lee**tle severe in your judgment in the Neptune case ? Had I known in the early part of the history of the matter, all we now know, I think I should have been disposed to abate not one jot of Adam's claim to a full and absolute equality with Leverrier as to the share either had in the discovery of the Planet, I mean the theoretical discovery - for I do not consider the difference of a degree or two in the calculated places a matter of moment.

Adams had an absolute priority of several months in his announcement of the place - his announcement was formal and official inasmuch as it was made to the official representative of Astronomy in Great Britain which amounts to a publication. You have cited Waring but Warings words are "is mihi semper habebitur inventor qui prius evulgauerit aut saltem cum amicis communicaverit".

Publishing Discoveries Great

Early Hopes ... 1917 Envelopes ... machine

Theoretical Perturbation & Politics

Old bachelor

Big Ben

Intends to speak on Jokes Bill

Secs of R.S to be paid

Adams & Leverrier again

See p. VI

v. p. 2

10.2.33. 39.

But no dictum of Arago, Waring, Lord Mansfield or any authority whatever can put out of court an established matter of fact. Hall really and truly was the first inventor of our Achromatic telescope. Adams as really and as truly the first theoretical discoverer of the Planet Neptune. Hall took no steps to make known or to secure his invention. Adams put on record in the hands of the Astronomer Royal his result with its date. As to all the rest it may be settled according to peoples tastes and notions of what is meant by the "honour" of a discovery - or its "glory".

I have a notion that people who like myself were entrainés by the sequence of events as they arose to their vision (or many of them at least) must be disposed (as I am) to regret having ever so little hooked Adams on the lower peg on that occasion.

1860. Feb 11. Lassell. .. I heartily congratulate you on its completion (the Malta Telescope) I hoped to have been able to mention the final completion of this great (the Malta Telescope) work .. in the little Article on Telescopes which I have been writing for the Encycl: Brit.

I am glad to find you have adopted the Skeleton form of Tube and (of which I had never any doubt) that it improves the definition.

1860 Mar 17. Herbert Spencer. 1820-1903. Whole letter - shows JTWH's position.

1860 Mar 17. To Herbert Spencer.

I have formed from the perusal of your Essays & other works that sort of opinion of the value of what emanates from your pen in a deliberate & thoughtful manner (albeit unable to assent to a very large portion of the positions you maintain) that I shall much gladly become a subscriber to the work you purpose to bring out.

Permit me to say that I would wish you had not adopted in the very first outset of your Programme the Shibboleth of the Hegel & Schelling School of German Philosophy "The Absolute" — I remember asking a German friend deep in all the learning of those Egyptians, what was the meaning of this Cabalistic word. His reply as that of a man who really had studied those matters deeply was memorable: "Die Absolut — Sehen Sie — ist das dunkle Loch worin man kuckt und — Nichts siehet!"

I believe the Anglo Saxon mind is not to be led astray or puzzled by a word. If by the Absolute it is intended to indicate that ultimate point (very different from A = A.) in which all knowledge must center & in which the Spiritual & Material Worlds (absurdly described as antithetical) are connected and reconciled, that which "transcends not only human knowledge but human conception" "lies the only possible reconciliation of Science & Religion" well & good, but I wish it could be spoken of under some form of expression (& our language is not wanting in power) which would not recall the feeble peculiarities of the German Authors I have named who had done a crying injustice to a mighty theme. I am ready to hope & believe that it will receive better treatment at your hands.

1860 Mar 29. Sabine. I am sorry to see a project for the change of locality of the R. Obs.[y] mooted. I hold very strongly to that site as I think (to say nothing of ancient prestige) it is so interlinked with our Geography & Astronomy as a Zero point both in Longitude & Latitude that a very serious evil will be occasioned by a change ... it will require a long series of observations to place that de novo ... the necessity will arise of a new constant of reduction to bring them to coincide. And it is very probable that many will forget to apply these & absolute errors of confusion will arise between the new & the old longitudes of place ... This is a point of all others in which I shd be disposed to defer to the opinion of the A.R. .. I deeply regret that I must not think of personally attending the meeting.

It is now many months that I have not ventured to put my nose out of doors (even to go to church which is within 200 yards of my door) except for a few moments when tempted by appearance of sunshine &c., and then, always to feel the effect in the form of a fresh recurrence of aggravated symtoms, of a very distressing nature... It is snowing today & every day (but yesterday) for a long time past.

1860. May 3. Sabine. I return you Mr Baily's note, of one or 2 points of which I have taken the liberty to make a memm: in case I should be able to get up my steam enough for a review of the progress & present state of the subject & its future prospects, but I have been so much flattened down within these last 6 months that I cannot set to that or to any thing else with any spirit & am content to dawdle away my time in working up into a general Catalogue of Nebulae all those I can find notice of, a work of mere patience & time, calling for little or no thought. ... This last season has been a singularly instructive one. The Sun went South in a state of wonderful excitement & has been boiling the Great South Sea Caldron & baking the Australian pre-exist with most unusual energy. Thence an altogether abnormal production of aqueous vapour & transfer both of air & vapour from the Southern to the Northern Hemisphere. Hence the unusually fierce & prolonged gales of wind, the immense precipitation of rain hail & snow & the sudden & violent alternations of NE & S.W Gales for which these last 6 months have been more remarkable than any I can remember.

1860 [Was using his energies on dismantling & selling 37 Tavistock Place.]

1860 Aug 22. Fitzroy. I am trying to get a Coup d'oeil of the Meteorology of last year. ... If you have any record of the temp[e] of the Gulf Stream ... for it is from that source that I am disposed inclined to seek the explanation of the unusual amount of atmospheric moisture ... which has formed so remarkable a feature of this season.

1860 Sept. Paterson [A draft of a published letter. Ops 271.]

1860. Sept 4. Biot 1774-1862. ... I cannot refrain from troubling you on the instant for (another of your precious works) ... I would willingly hope that I might one day in Paris renew these ancient recollections. ... but alas! we are both growing old & I perceive (from the work you have just sent me) that though younger in years (68 & 86.½) I am already an older man than yourself. Any how I am sure we shall find one another out in the long future & for the future & while here on earth believe me etc.

re Morning & Greenwich Observat[y]

Ill health

Ill health

Cat. of Nebulae

& Causes of Wild weather

37 Tav Pl. Sept 15

Meteor[l] Obs

Ill health

Brit Ass 26

60.9.4.

TO A. De MORGAN.

37 Tavistock Place

In re 37 T.P. after a deal of considering pro and con I have made up my mind not to let but to dispose of the house entirely and with this view removed almost all the furniture here.

60.12.22

TO DR. SAMUEL NEWINGTON.

.. you will not object to your visit - I consider invitation ..

I have just got from the Society of Arts a proof slip of a description of my swing cot (which among its other good qualities in the way of comfort, effectually prevents sea-sickness, even in the roughest weather.).

[Is spending much time & energy chasing sources of knowledge, for lack of Sc. catalogued libraries

1861. Jan 29. Sabrina. I had hoped before this to have been able to draw up something satisfactory in the way of a Report on Terrestrial Magnetism for the Edinburgh Review. The time is come when such a thing ought to be done ... to prepare the public mind for some further steps to be urged on Govt at the next meeting of the Brit Ass: .. I have made two or three several beginnings ... The fact is that since Christmas I have been in a very debilitated state, having been laid up with an obstinate bronchial attack .. which obliges me to write thus from my bed & has so completely stupified me that I feel quite unable to grasp that, or any other subject in a large & lively point of view.

1861. Feb 12. Rev. H. A. Jeffreys. I return the Petitions - those agst the marriage with a deceased wife's sister signed by many of our household, myself included. As regards that for the maintainance of Church Rates, I am generally favourable to their maintainance, on the ground that the maintenance of our Parish Churches is essential to that of the Church of England & that the maintenance of that form of the Christian religion as a national one is of unspeakable advantage to the whole community, not only those who, adhering to its special form of worship & ceremonial, frequent its churches, but in the broadest sense to the whole body of the people including Catholics & Dissenters of every denomination inasmuch as it keeps effectually in check the worst extremes of Catholic domination & intolerance, & aids to keep down unbounded extravagancies, into which other forms of dissent which might aspire to predominance would be sure to run but for the existence of a reasonable & moderate Establishment, carrying with it the approval of by far the most numerous & influential body of the people. What is of use to all as a bulwark & security against great and otherwise inevitable evils, I quite agree should be maintained by all, but the Petition takes no general ground of this kind. And it commits itself to the assertion of a fact which its opponents, will instantly meet with a direct denial, viz: that in country Parishes all sections of the people in turn make use of the Parish Church. Now I have always understood that Roman Catholics do not frequent Protestant Parish Churches & I do not think it can be maintained that the mass of Dissenters, even in Country Parishes, do so. and, under that impression I really do not see that I can sign the Petition, though I readily believe its allegation that it is as fair a system of maintenance as the case admits.

1861. March 13. To Admiral Fitzroy.

[In re Remarks about tides] I see however that you adopt that (as I stated it) very faulty form of expression introduced by Faraday to the great detriment of Science & great confusion of ideas: "Lines of Force".

The lines or geometrical curves in space which he so designated, to present any meaning at all should have been called "lines of equilibrated polar arrangement". The curve of a chain hung up by its two ends might as properly be called a line of force as Faraday's magnetic & electric lines so designated.

1861. Apr 12. Mrs Somerville. ... You have seen wonderful things in your sojourn in Florence. 1860 was indeed an Annus Mirabilis but 1861 I take it, will be a Mirabilior. Yet how very admirably the Italians [take Italian as (what they now are and deserve henceforward to be considered as) a Nation] – have behaved under such difficult circumstances! How they have given the lie to those who held that they were mere children, incapable of united or rational action. As for the Kingdom of Italy I say, as every Englishman says, Esto perpetua, provided always they continue to go on as they are going on timing energy & devotion with soberness & good sense.

Visit to Italy in 1860

We are a dispersed family at present. Two of the boys are in India - one in London working at Chemistry with Dr. Hoffman - Bella with her friend Mrs. Power (formerly Miss Lipscombe). Amelia with the family at Leeds. My wife and one of her daughters at Hastings, and 4 of them here - one being the youngest, a little thing of 6 years old, one of the most intelligent creatures you ever saw, and with the disposition of an Angel. She is an infinite blessing and comfort to us all. Willy (our eldest) is Acting Magistrate at Kishnagur, and is fighting a great fight in the cause of justice and good policy in this abominable Indigo affair, which will, I trust, end in establishing the rights of the hitherto sadly oppressed native Ryotts to fair treatment and open out to them the possibility they have never yet enjoyed of working their way to prosperity by honest exertion.

Family affairs

The Editors of the Encycl. Brit: to which I have contributed 3 Articles [Meteorology Physical Geography & "Telescope"] have resolved on printing them apart. There has been no time for much revisal or enlargement, so that they will appear horribly meagre when placed beside any regular works on the subjects, such as your Physical Geography for instance, but it can't be helped. I have no time to give to making them better & they may serve to whet their readers' appetites for better books....

Ency Brit Articles

1861. May 12. Fitzroy. [on Rainbow reflected in water.]

Rainbow Op 280 Potato Fam

1861. May ? Fitzroy. ... It was one of the speculatory causes of the Potatoe blight Op. 280. that the Earth had got a whiff of the tail of some minute Comet en passant.

1861. July 14. De Morgan. ... I never proved the Sun to be liquid fire, but I was told at the Cafe that a preacher up country had said I had proved it. And he further declared that if anybody doubted the reality of Hell-fire torments, he had nothing to do but to come to Feldhausen where I would show him a red star I had just discovered which I had declared to be the very place etc etc ... By the bye what a very odd place the Sun must be according to Mr Nasmyth's willow-leaved discovery.

Yarrow dis Feldhausen

Ill health Comet (Feelings hurt) Botany

The truth is I have been all this summer in a sort of dreamy listless state in which the days and weeks have run past I know not how, and with nothing to shew for them - not uncomfortably - but most inefficiently and obliviously ÷ and if this comet had not mercifully come to give a fillip to things in general, I am apt to think I might have gone out like the snuff of a candle... But this blessed comet has infused a little life into things ... & has been wonderfully exciting.

1861. July 21. Tyndall (on Solar Chemistry, Feelings hurt.).

1861. June 21. Sir W. Hooker [Botany]

1861. Aug 15th To Sir J. Lubbock. ... If Meteors be Satellites of the Earth I conceive they would be limited to a moderate range on either side of the Ecliptic & would all travel from West to East as the Moon does. i.e. If Satellites in the proper sense of the word. Casual aerolites which may have just escaped striking the Earth but may have had their velocity retarded by momentarily grazing the atmosphere so as to be retained by the Earth's attraction, may indeed exist & may be pretty numerous, but these can only be a small percentage of the total number of Meteoric bodies & these may move in any direction. The real question seems to me to be not whether there may be such exceptional cases, but whether Meteors in general be bodies shining by reflected sunlight & whether their extinction in general be caused by their falling plunging into the Earth's shadow. ... For my own part I cannot help believing that there are several distinct sorts of Meteors, some of them (the great Bolides) Electric (glow-discharges) or magneto-electric – some real stony masses – some vaporous & quasi-cometic bodies

Meteors (cont)

Several sorts

1861. Aug 15. Sir J. Lubbock. .. I cannot help believing there are several distinct sorts of Meteors.... and some "from the Devil's own". Such an one was (one of Schmidt's which after explosion threw back a Meteoric fragment in the reverse direction (coming) of that given me which I saw stationary near the Zenith which had a round disc like the Moon (but smaller) & which threw such a light on all objects as made me look up to see What it came from. I was at the time looking out from the top of the ladder of the old 40 ft telescope, for rockets at Vauxhall, to get difference of longitude with Blackman Street. We are rejoiced to have such favourable accounts of your son Montague. But he must be very cautious in not incurring mental fatigue & especially of straining his memory by trying to recollect things. Sir H. Holland denounces this as a most injurious thing when the Brain is weakened by any cause, or old age.

1861. Oct 7. Fitzroy ... ["The atmospheric Railway Station" a place in the New Road marked by a lot of immensely high ladders standing upright in the air, which can be for no other use.].

1861. Oct 24 Sykes [an extremely sensitive instrument for balloon ascents] Brit A. Balloon Com^n

1861. Nov 5. Brequet [To get him to make one.] (does not reply favourably Mr. FH.)

1861 Dec 5. Whewell [an account of the Norwegales as for the impending American War.

As for my "scientific activity" as you call it, it has been standing at zero for a long, long while and all I am now about is getting up a popular lecture on the sun adapted to the meridian of our Hawkhurst tradesfolk and farmers - but Bella is preparing some grand pictures of the spots - red flames - spectrums - and willow leaves and a superb Disk of the sun 6 feet in diameter which I expect will make them gasp and stare. This and the Translation of the 1st Book of the Iliad into Hexameters is all that I am now about and dawdling over them both on the principle "Dilator spe longus iners avidusque futuri", which comports with a septuagenerian state of affairs. This latter attempt was excited by an article in the Times not long back on Translations of Homer. It is shockingly bald and homely by the side of Pope - but I flatter myself a good deal more like Homer.

1861. Dec 6. Sabine [Inventing an instrument to take temp^s up in a balloon, rapidly.)

1861. Dec 12. Whewell. .. Hermite I send you the beginning of my Hex^c Trans^n of Bk I. Iliad. .. So far as the naturalization of the Hexameter goes I am not dissatisfied with it: ... .

1861 Dec 2 Hind. Suggestions as to naming new Asteroids. List of names.

1862 Jan 2^d. Whewell ... In many cases I say "a true bill" to your objections, in some I venture with due deference to retain my first impression. ... There is one observation however, I w^d make which takes off the edge of several of your objections: In reading verse, accent & emphasis are not to be confounded .. So now don't think me an obstinate recusant ... .

(Death of Bid.)

To T. Davies Feb 17 62 There can be no doubt that L^d Rosse's composition is really very much more reflective than my Father's, used for the 40 ft reflector was, perhaps, surface for surface & polish for surface, doubtly so. You will bear in mind that my Father was obliged from the brittleness of the metal & the extreme difficulty he found in obtaining entire castings to lower the proportion of tin in his large metals, very much below the proportion which small ones w^d bear & so to lower also the reflective power. At that time this could not be helped. And he had also excessive difficulties of a mechanical nature to contend with, which do not exist now. etc.

1864. Dec 10 To Walker.

1862 Mar 15 To Robt. Harley. ... Sir- you kept on a copy of (Op. 10) that work, I beg leave to repudiate all that occurs from p. 100 to p. 105 as founded on a mistake. I was very "green" (18½) when I wrote that paper.

62.4.10.

TO W. WHEWELL.

I have begun (translating) the 2nd Book (of the Iliad) but have not done much as I am making out a General Index Catalogue of Nebula which is in progress of reduction to 1860 under Airy's kind superintendence and I have to feed the computists who are said to be perfect cormorants of work.... .
P.S. Alex. is a candidate for the professorship of Natural Philosophy at the Andersonian University of Glasgow - the duties of which consist chiefly in lecturing on the various branches. It is not a very distinguished and apparently very far indeed from being an even moderately well-paid one - but it is of very great importance to him that he should be now doing something with distinct duties attached to it, and I am anxious that he should succeed as it may fix him in his pursuit of science.

62.4.17.

TO W. WHEWELL.

I don't like Book II. The repetitions are wearisome. The catalogues of Ships is simply abominable. ... Never mind it is capital fun, and if I live 10 years longer I shall have done old Homer ~~Brown.~~ brown.

I don't want to see Mr. Landon's translation - I am quite of your opinion and don't want to see other's renderings in advance of my own. To say the truth, of those I have seen, I like my own best.

To Adl. Fitzroy 62.4.23

As to the influence of the full moon I consider it as proved past all contest. In addition to those observations which I sent Lord Lovelace, I have since kept account of all the full moons (with now and then an accidental exception) and the preponderance of cases in point is so striking as would I am sure convince anybody. Tyndall's late discovery that air is perfectly ~~Fondalle's late discovery~~ transcalescent but that vapour is a great absorbent of heat, added to the fact that the heat radiant from the moon is no longer solar heat, but what we may call culminating i.e. emanating from a sur= face below redness & therefore very far more absorbable, I think gives a very fair ac= count of the phenomenon; at, and a day or two after the full moon, a very large portion of its surface is, I conceive, very highly heated, perhaps to 300° to 400° ?.

1862 May 2. De Morgan. I have your paper on the Theory of Errors of Observations". I am afraid I shall not be able to follow it all out, for I find myself every day getting more & more unable to carry out a concentrated attention on the steps of a lengthened train of mathematical reasoning [Have just fatigued himself with a letter on to Fitzroy] Whether it be a "softening of the brain" or a tendency to back away from the collar at a dead pull which points to the knacker's yard as the next & more appropriate des= tination I hardly know. ... ~~As to the Hexameters~~ ... ~~P.S. How many people went out of the Ark before Noah?~~

....As to the Hexameters, you are in your sins! So there is no help for you - only I hope that you will not die hardened and impenitent, but that Grace will find you out in its own good time. Meanwhile I am pretty far on in Book 2, but I don't much relish the Catalogue of the ships. The only Catalogue that interests me now is a Catalogus generalis Nebularum in initium 1860 reductarum, which I am getting reduced to 1860 under Airy's inspection by a small grant from the R.S. for expense of computation and which I think will be useful especially as these same nebulae seemed to be disposed to play at hide and seek now and then.... P.S. How many people went out of the Ark before Noah? Ans: Three, because it is recorded that Noah went forth from the ark! ~~62.5.20.~~

1862 May 8. Whewell ... In reply to your kind invitation to come to you at the Meeting of the B.A in Oct: But that sort of thing is more than I can face now, the bustle, the general effervescence, the Speechifying, the Committees & the Sections.... ...I have not seen Arnold & I don't think I shall read his Lectures, at least I shall not go out of my way to read his books... [? "On Translating Homer".]

1862 May 27 To J. M. Caansuit. [Enthusing on para 28. of his Nat: Philos:] ...

1862 May 29 De Morgan. ... But what you say about Sylvester's Theory of Contrariety & my expressed assent to it. (while it connects itself with certain speculations on the nature of matter which have been part & parcel of my thoughts ever since I thought at all, & which I trace up to a hazy recollection of my Father's talking to me about Boscovich & his centers of force.) follows in with "a dialogue between Hermogenes & Hermon

... I am a thorough-going Atomist and Boscovichian (of course in a very enlarged sense of the word) believing the material universe bona fide to consist of atoms, but understanding by atom not one indivisible solid but a local center - i.e. an absolute geometrical point &c. and from (and for aught I know around) which forces tend, those forces being the direct result of a single will guided by a single intelligence, and pervading all space. Some, or all of these atoms may or may not also be local centers of qualities, vitalities, subordinate intelligences, sensations, or indescribabilities and inconceivabilities for which we have no names. I suppose this is pretty nearly Leibuity's notion of his monads.

I find myself condemned by the London Reviewers to be burnt alive as a "hoary offender" with Whewell, Dart and ~~Lord~~ Lindsay for my unhappy hexameters - and while smarting under the idea of such a fate comes a book just now per post from a Sonnetteer I never heard of before charmingly bound in purple Russia and inscribed:-

"I seem - nor slight my knowledge of the Greek
To hear in H --'s English Homer speak." -

which drops like healing balm upon my wounded spirit!

1862. May 31 To T Parsons. Not sent. [A furious denial of the statement in Stroud Journal Sat: May 10. 1862. a short biography of Mr H.J.]

1862 July 2. Smyth. [Head on R.A.S. medal is that of Sir I. Newton.]

1862. July 3. Brayley. (see Op 304) Motion of Glaciers

1862 Oct 1. G.Smith. (re Homer's Iliad) ... I may mention by the way that the remuneration you thought fit to make me .... was so liberal that I have no wish it should be repeated in this, but shall be perfectly well satisfied if you will supply me with a 100 copies of it gratis for private distribution. [JWH's own view on his work, copy?]

1862. Oct 29. Whewell. ... What is to be done in the matter of this lamentable blow up between Airy & Sabine? Surely A. has taken up the matter in a very high handed & violent manner & one that seems to be meant as closing the door to anything short of some extreme measure. After all it is not a deadly sin to say that human works are, the very best of them, liable to imperfection, & that it is better to have two strings to one's bow than one, let that one be ever so good. This circular dropped on me like a clap of thunder in a clear sky, for I did not know there had been any bickering at the Brit: Ass: Anyhow I do not see that the Board of Visitors can erect themselves into a court martial of the kind insisted on by the Astr: Royal & proceed to vote the expulsion of its Chairman!.

1862. Nov 12. Twisleton. ... I really have no definitely formed opinion as to the best possible course of School Studies at Great Public Schools. I agree with the present system as far as I understand it as to the great importance of a large share of attention .. being given to the Classical languages & I certainly do think it desirable that one or two modern languages sh^d be taught efficiently, and if one only as a School language, I should prefer German, as one of the great roots of the English, and because every gentleman is sure to pick up French. And I should insist on Arithmetic (up to rule of 3) being thoroughly well learned by boys under 14 & 4 books of Euclid & Algebra and square root, as far as quadratic equations & as applied to 2^nd Bk Euclid by boys over 14. ... As regards Nat: History, The Physical Sciences & Mechanics, I think of course I should not object to a few lessons of an attractive nature being given, I am very much disposed to believe that the interval between School & the University would on the whole be the most advantageous period for acquiring some knowledge of them ....

1862. Nov 16. Lady Lubbock. ... I cannot admit that any amount of human conviction can justify doing that which in the sight of God is wrong. But, if accepting so awful a responsibility, the wrong is done, I believe the motive will have its weight with the Supreme Judge in mitigating the condemnation, always supposing the faculties of the agent to have been bona fide exerted to the utmost to discover the distinction between the wrong & the right line of conduct. To do ill (known ill) that good may come is indefensible. To abstain from what we think good if there be a shadow of doubt in our mind, is equally a duty. Anyhow it is well for us that the ultimate Judge of our actions is also a Judge of the fallibility of our judgements & of our liability to mistakes.

1862 ... W.R. Grove. ... As to the absolute establishment of the doctrine that heat is only a form of motion, I confess myself, not indeed sceptical but not fully convinced.

63.1.2.

TO D. von MONKHOVEN.

Your work entitled "Traité Général de Photographie": (which you propose to dedicate to me) ...

May I therefore be permitted to make a few remarks on those parts of it, which relate to my own contributions to the subject of Photography.

In the Introductory Chapter, headed "Historique" you profess to give an account of the earliest stages of photographic invention and discovery. In page 16 you have noticed the publication (in Jan. 1839) of Mr. Talbot's processes and (in Aug. 1839) of M. Daguerre's. You have also in the preceding pages noticed many of the earlier antecedent observations of the chemical action of light. But among these, I see no mention either 1st. of the very remarkable, copious, and instantaneous precipitation of the muriate of Platina mixed with lime-water when exposed to solar light. (Read to the British Association, Oxford June 22, 1832, and printed in the London, Edinburgh, and Dublin Phil. Mag. N.S. No. 1.) or 2ndly. of my communication to the Royal Society of London (read on the 14th March, 1839, and printed in their monthly notices for that year) in which I described my own early experiments - recommended the hyposulphites for fixing, and which I accompanied by, I believe the first specimen of the image of an external object fixed on paper from the focus of a lens. As regards the hyposulphites I see that you have in p. 170 attributed their instroduction into photography to me, but you were probably not aware that this mode of fixing presented itself to me most naturally in the very first commencement of my experiments, I

having been the first to make known (in the year 1819, Brewster and Jamieson's Ed. Phil. Journ. Vol. I.) the existence of that class of salts, and (page 27, Vol. I) the extreme solubility of Chlor. Silver in hyposulphite of Soda. In my first paper in the Phil. Tran. it is mentioned that Daguerre used the hyposulphites - but I have reason to believe that he originally fixed with Chlor. of Sodium and only adopted the hyposulphites when my use of them had become known.

As regards the production of Colour from what you say in p. 19 the reader would conclude that my observations on this subject were limited to the notice of red and blue glasses placed over argenturetted papers, producing identical colours (i.e. red and blue). Now 1st. I do not recollect to have anywhere stated that a blue glass will produce a blue colour - and 2ndly. in my paper (Phil. Trans. 1840, page 18) I have described an experiment in which a coloured resemblance of the spectrum (without the interposition of any coloured glasses) was produced on Chloride of Silver the red, the green, and the blue, though sombre colours, being in their proper places. It is very true that the reproduction of the Prismatic Colours by M. Becquerel (which you mention) is much better, but I think I may fairly claim to have made the first step in this direction. I afterwards obtained a better green by using the fluate of Silver but I cannot at this moment cite the work where it is described.

On the other hand no person reading that portion of your work would be led to attribute to me any share in the discovery of the processes immediately afterwards mentioned, in which the use of the Ammonia-citrate of Iron are noticed (processes peculiarly my own) nor in those other designated as Cyanotype and Chrysotype, which are described in my paper (Phil. Trans. 1842, pp. 210, 206) on the contrary the implication is quite on the other side.

The notion universally prevalent among practical Photographers that the rays of less refrangibility than the yellow or rather than the green are useless and inactive is a mistake much to be deplored. I have done my utmost to call attention to this, and I take this opportunity once more to insist on it. I doubt not that some day or other a process of development will be discovered capable of acting as effectually on the feeblest traces of luminous action on Bromuretted Silver produced by the less refrangible rays, as those now in use do on the traces (equally feeble) left by the more refrangible. This will produce a revolution in the Photographic Art and this is the point to which experiment ought especially to be directed. I entreat you, Sir, in what is to follow of your work to say a few words calling attention to this most important and ill-understood point.

1863. Jan 22. Whewell. Many thanks for your Lectures on Pol: Econ:. I can imagine you delivering them to H.R.H, you in your Cap & Gown in a great armed chair & he in his Cap & Gown placed right opposite you, note-book in hand on a stool drinking in the words of wisdom. It must have been an edifying spectacle. ... We are under a cloud at present. Poor Julie has been now going on for 3 weeks down with a nasty low continued fever which has exhausted her strength to an extreme degree. We trust she is slowly on the mend... The same sort of thing is going about here to a great extent. [Julie had typhoid.] 63.7.17. [The returning girls got ill.]

1863. Feb 26. De Morgan. ... We are all at 6's & 7's with a nasty fever in the house. One of my daughters has been very near death, but is now thank God, convalescent, but it seems to be spreading among us & we have dispersed the well portion. .. Have you read Challis on the Ether? & the Zodiacal Light? Is he mad? or has he really found some brand new integration of the "general equation of Hydrodynamics"?

1863 Apl 13. Sir Ch. Lyell. ... As for the book itself (The Antiquity of Man) which I have read through to the end with increasing interest.. I had no idea that there was such distinct & positive evidence of the existence of actual human bones clearly proved cotemporaneous with those extinct creatures. This point seem to be definitely settled & henceforward, it will I presume be regarded as equally so that we must enlarge our scale of time for human existence & this granted, whether 10,000 years or 100,000 or 100 million of years be assumed matters little, so far as upsetting our preconceived notion of 4004 + 1863 years = History. All this is ground cleared reclaimed and fenced in & included in the domain of positive knowledge & this of itself is a great result. ... Most striking however is your suggestion of the im= provement of the mental faculties of our own species by the occasional in= troduction into the mass of humanity of individuals of markedly superior mental (& why not also of moral) faculties, which not merely by heredit= ary propagation but by the influence of mind upon mind ... go to leave the whole mass. Call it by what name you will such a process (by which it is perfectly conceivable that the man might be "developed" from the monkey) is nothing short of direct inspiration. And the prospects which such a view of the subject opens out as to the future of humanity are so noble & so grand that it is impossible not to be carried away by a sort of enthusiasm in contemplating them.

1863. Oct 11. A.R. Clarke. ... I have calculated ... so that with no further change than the increase of our standard yard, foot & inch & by an exact $\frac{1}{1000}$ we should be in possession of an almost mathematically perfect metric system, which might be decimalized ...

1863 Oct 25. Sabine. ... My view of the proposed change of our system of weights & measures for the metric. (Op 307) .. I flatter myself I have made out such a case in favour of retaining our own (with a merely nominal change, or with no change whatever) that it will be very difficult to support the metre against it.

1863 Oct 27. De Morgan ... (re "Greek Fire") ... I see in the paper of today that they are beginning with it on Charleston again ... But I suspect ... we could compound a much worse affair. ... The night after the Earthquake at the same hour 3. a.m my wife was wakened with a loud explosion. So was a young lady who resides about 2 miles off. So was her mother's coachman & his wife & so was a clergyman of a neighbouring parish 3 or 4 miles off in another direction.

1864. Feb 27. R. Hodgson. [Defending himself as first user of a plate glass (rough reflector prior to 1847. whereas Pritchard appears to have stated that Hodgson (in 1863) was the first.

1864 March. Herbert Spencer. ... In the matter of M. Auguste Comte & his "Philosophie Positive" as respects any influence or impression which his writings, so far as I have read them (which is but little) may have had on my mind, I would ask you to form your own opinion from what I have said in express reference to one remarkable enough exhibition of his abilities as a physical, logical & mathematical reasoner, in an address which I read before the Brit: Ass: from the Chair in 1845 at Cambridge. .. As regards any influence his writings may have had on others, I should think it very presumptuous in me to express any opinion in cases where the parties themselves concerned are persons to whose opinion, on such subjects, I should attribute the smallest weight, and as to others, I hold it a matter of perfect

Ill health

1864 Apr 2 Whewell. ... As for myself I have been fairly flabbergasted by/now nearly 3 months of the most abominable bronchitis attack I ever experienced & am become a walking nuisance & a standing opprobrium, coughing sniffling &c in the most unbearable manner. What is worse it shows no sign of abating.

Metric System

1864 Apr 21. Whewell. .. I see the 'Metricists' are very rampant at the Brit Ass: and I fear me much that if some counter movement in the form of a Petition to the House is not got up they will succeed in driving on the House to a compulsory measure. ...

Riemann's Theory.

1864 Apr 30 H.W. Cookson. [Trying to avoid an Honorary Degree. [Where? McTH.]

1864 May 3. De Morgan. ... Have you heard any thing about a certain German Geometer Riemann or Rehmann, who has devised a totally new way of envisaging the relations of space, giving rise to methods & theorems of immense power & generality, throwing into the shade, & to an immeasurable distance behind, all the received methods & Calculi? Sylvester, whom I met the other day was talking about it but I could gather nothing from him of the nature of this new conception & he said that it had puzzled all the German geometers to understand it, for a very long while, but they are now beginning to see its meaning & importance.

Ill health

1864 May 4. De Morgan. ... I have never been able to get straight ideas about series that become divergent or cease to converge after a certain point. ... I have been sadly off the hooks of late. I indeed so have several of us. That nasty lingering fever of last year came back & kept one of our daughters (Fancy) a month or 6 weeks in bed — and a lady on a visit was taken ill (but not with that) & kept us in much alarm for a couple of months. And then it came to Lady H's turn, what with nursing etc, & she is now coming downstairs for the first time for a long time, and as to myself, from the middle of January to this present moment I have been in the claws of the most detestable succession of attacks of influenza or Bronchitis ... that have made me a torment to myself & all about me, & fairly taken all the spirit out of me. So as to doing anything but dawdle over odds & ends, and translate a few more books of the Iliad I have nothing to say. Only this Bill of Ewart's sticks in my gizzard & I have caught at any opportunity to put the matter as regards British measures & weights quite clearly before the public through the medium of Macleod's "Good Words" which has an immense circulation. The strong point of all is that our weights & measures of capacity are already in what may be called perfect conformity with a geometrical foot. Far more perfect than the conformity of the French Litre & gramme with their own geodesical metre. I attended the first meeting of the Brit: Ass:. Committee but I forbad it composed of men resolved on reporting in favor of change & so I shook the dust from my feet & went out from among them. ....

Metric System

British Measures

Times

JANUARY 1 1938

S OF THE MONTH

EVENING SKY



of Professor H. H. Plaskett, who made his early reputation on the other side of the Atlantic, is being supplied with appliances suitable for advanced solar research, and has additions to its staff in place of Dr. Fotheringham and Mr. Bellamy, Mr. Page, of Yale, and Miss M. G. Adam, of Oxford. Thanks to Lord Nuffield the other Oxford observatory, the Radcliffe, is finding a new home in Pretoria with a telescope said to cost £40,000. Dr. Knox-Shaw, Radcliffe Observer, takes with him Dr. Redman, assistant director at the Solar Physics Observatory, Cambridge, whose place is being taken by Dr. A. D. Thackeray. Dr. Smart's appointment to Glasgow caused a vacancy in the Cambridge Observatory staff, which has been filled by the appointment of Dr. Woolley, chief assistant at Greenwich, who has been succeeded at the Royal Observatory by Dr. R d'E. Atkinson, formerly of Oxford, but has since held an appointment in Physics in America. Dr. Arthur Beer from the Solar Physics Observatory, Cambridge, is now first assistant at the observatory at Mill Hill, Hendon, belonging to the University of London, the death of the director of which, Dr. Filon, has just happened, and Dr. Blumbach, formerly director of the Central Chamber of Weights and Measures, Leningrad, who has made his home in England for some time past, has accepted a position in the Norman Lockyer Observatory, Sidmouth.

These changes and the capacities of the gentlemen involved in them all indicate the trend of the science to astrophysics—the application of the spectroscope in its various forms to the Sun and to the stars—rather than to astronomy of the kind that was in vogue 100 years ago. Meridian observation for the purpose of making star catalogues is practised by few observatories, and planetary and cometary observation is left to so-called amateurs, a name that is by no means opprobrious. Solar physics may be said to have had its origin about 70 years ago when there was much discussion as to the "willow leaves" of Nasmyth, or "rice grains," the early names for flocculi, which were best seen with Sir John Herschel's device, consisting mainly of a piece of plate glass for reflection and a neutral tinted shade and was then the most elaborate addition to the telescope for solar work. The contrast with the present day is edifying.

Years of Early Solar Research
I. 170

hilst empld. with the R.A.F. (Jan. 1, 1938); Lt. (local Capt.) J. B. Ready, R. Berks. R., to be D.A.A.G., Sudan Def. Force (Jan. 1, 1938).

REGULAR ARMY RESERVE OF OFFICERS

The following having attained the age limit of liability to recall, cease to belong to the Res. of Off.:—

GENERAL LIST

Col. (Hon. Brig.) A. H. D. West, D.S.O. (late R.A.) (Dec. 27).

MISCELLANEOUS.—Maj. N. Nicholson (Jan. 1, 1938).

Sec. Lt. A. G. Fraser resigns his commn. (Dec. 8).

REGIMENTAL LIST

ROYAL ARTILLERY

Capt. W. Pearce, having attained the age limit of liability to recall, ceases to belong to the Res. of Off. (Jan. 1, 1938); Capt. H. L. Harding (late R.A.) to be Capt. (Jan. 1, 1938), with seny. Sept. 19, 1935.

INFANTRY

R. FUS.—E. C. Smith, late Capt., I.A.R. of O., to be Capt. (Jan. 1, 1938), with seny. Aug. 1, 1935.

The following having attained the age limit of liability to recall, cease to belong to the Res. of Off.:—

DEVON R.—Capt. B. Ord, M.B.E. (Nov. 14).

E. YORK R.—Maj. J. S. Porter (Jan. 1, 1938).

CAMERONIANS.—Sec. Lt. A. G. Douglas, D.C.M. (Jan. 1, 1938).

K.R.R.C.—Maj. A. L. Bonham-Carter, D.S.O. (Jan. 1, 1938).

CAMERONS.—Maj. J. G. Simpson, D.S.O., M.C., (Jan. 1, 1938).

SUPPLEMENTARY RESERVE OF OFFICERS

The following to be Sec. Lts. (Jan. 1, 1938):—

CAVALRY

5TH INNIS. D.G.—T. M. Kirkwood (late Sec. Lt., T.A.).

9TH L.—W. T. Cadman (late Off. Cadet, Cambridge Univ. Contgt., O.T.C.).

ROYAL ARTILLERY

Sec. Lt. J. T. Falconer resigns his commn. (Jan. 1, 1938).

The following to be Sec. Lts. (Jan. 1, 1938):—

FOOT GUARDS

S. G'DS.—H. L. St. V. Rose (late Off. Cadet, Oxford Univ. Contgt., O.T.C.); M. S. C. Gull (late Cadet Corpl., Eton Coll. Contgt., O.T.C.).

INFANTRY

R. SCOTS.—N. C. Ogilvie (late Cadet, Ampleforth Coll. Contgt., O.T.C.).

BEDFS. AND HERTS R.—E. T. L. Spratt (late Cadet, Bedford Sch. Contgt., O.T.C.).

WORC. R.—P. Chichester (late Cadet, Downside Sch. Contgt., O.T.C.).

E. SURREY R.—Sec. Lt. H. P. Gardner resigns his commn. (Jan. 1, 1938).

OXF. AND BUCKS L.I.—J. F. Nicholson (late Off. Cadet, Cambridge Univ. Contgt., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

WILTS. R.—Sec. Lt. R. S. Biddulph resigns his commn. Jan. 1, 1938).

SEAFORTH.—R. D. Robertson (late Cadet, Merchiston Castle Sch. Contgt., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

ROYAL TANK CORPS

Sec. Lt. A. A. Rogers ceases to hold a commn. (Jan. 1, 1938).

ROYAL ARMY SERVICE CORPS

The follg. to be Sec. Lts. (Jan. 1, 1938):—H. C. L. Weatherley, W. E. Norkett, B. V. Harmes, A. W. J. Tizzard, H. W. S. Allen (late Cadet Lce.-Corpl., Dean Close Sch. Contgt., O.T.C.), J. R. A. D. Maule-Finch, E. S. W. Perkins.

TERRITORIAL ARMY

COMMANDS AND STAFF

Col. (temp. Brig.) J. F. R. Hope, C.B.E., D.S.O., A.D.C., relinquishes the appt. of Comdr., 129th (S. Wessex) Inf. Bde., and the temp. rank of Brig. (Jan. 1, 1938).

SCOUTS

SCOTTISH HORSE.—Sec. Lt. T. M. Kirkwood resigns his commn. on appt. to the Supp. Res. of Off. (Jan. 1, 1938).

CAVALRY

INNS OF COURT R.—Corpl. Sir J. E. T. Ritchie, Bt. (late Offr. Cadet, Oxford Univ. Contgt., Sen. Div., O.T.C.), to be Sec. Lt. (Jan. 1, 1938).

ROYAL ARTILLERY

66TH (S. MIDLAND) FD. BDE.—Lt.-Col. and Bt. Col. C. A. H. Fairbank, M.C., T.D., is supern. on vacating comd. (Jan. 1, 1938); Maj. J. A. Hooker to be Lt.-Col. (Jan. 1, 1938).

58TH (KENT) A.A. BDE.—J. A. Porter (late Cadet Corpl., Radley Coll Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

64TH (NORTHUMBRIAN) A.A. BDE.—Sec. Lt. R. B. Robson to be Lt. (Dec. 1).

ROYAL ENGINEERS

26TH (L.E.E.) A.A. BN.—Corpl. F. T. Walton to be Sec. Lt. (Jan. 1, 1938).

27TH (LOND.) A.A. BN. (L.E.E.).—C. R. Fairey, Esq., M.B.E., to be Hon. Col. (Jan. 1, 1938).

28TH (ESSEX) A.A. BN.—Sec. Lt. J. E. Lee, from 30th (Surrey) A.A. Bn., to be Sec. Lt. with seny. as in the T.A. (Dec. 1).

43RD (D.W.R.) A.A. BN.—E. P. Crook (late Cadet, Leys Sch. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

44TH (LEICESTER R.) A.A. BN.—S. Gardner to be Sec. Lt. (Jan. 1, 1938).

ROYAL CORPS OF SIGNALS

42ND (E. LAN.) DIVL. SIGS.—Sec. Lt. R. H. Clegg to be Lt. (Nov. 14).

48TH (S. MIDLAND) DIVL. SIGS.—J. W. Swinnerton (late Offr. Cadet, Birmingham Univ. Contgt., Sen. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

INFANTRY

5TH BN. R. NORTH'D FUS.—J. D. L. Bastable (late Cadet Lce.-Corpl. St. Bees Sch. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

5TH BN. LEICESTER R.—Sec. Lt. M. Moore to be Lt. (Nov. 14).

4TH BN. R.W. FUS.—F. E. D. Griffiths to be Sec. Lt. (Jan. 1, 1938).

5TH/8TH BN. CAMERONIANS.—I. M. M. Rattrie (late Cadet, Glasgow High Sch. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

4TH BN. P.W. VOLS.—Sec. Lt. J. Day to be Lt. (Nov. 9); B. H. Bagnall (late Cadet Lce.-Corpl., Uppingham Sch. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

4TH BN. K.S.L.I.—Capt. (Qr.-Mr.) S. J. Caloe having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform (Dec. 30).

9TH BN. H.L.I.—H. J. Bernthal (late Offr. Cadet, Glasgow Univ. Contgt., Sen. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938); D. Currie (late Cadet Serjt., Fettes Coll. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938); D. Duncan (late Cadet Serjt., Glasgow High Sch. Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938); W. S. Taylor (late Cadet Lce.-Corpl., Glenalmond (Trinity Coll.) Contgt., Jun. Div., O.T.C.) to be Sec. Lt. (Jan. 1, 1938).

4TH BN. GORDONS.—Capt. (Qr.-Mr.) H. Rennie, M.B.E., having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform (Jan. 1, 1938); Lt. D. C. McConnachie to be Capt. (Jan. 1, 1938); D. J. Pa[illegible] (Jan. 1,

RIFL

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1864 May 16. Whewell. [Still suffering & bronchitis ... "yesterday was the worst day I have had yet".]

1864 June 18 Tyndall .. I ought to apologize for running out into such a discussion but the fact is, I cannot reconcile myself to the exceeding laxity of language into which I observe a tendency among physicists at present to fall, in confounding the terms, force motion energy, meaning sometimes mechanical effort, sometimes vis viva & sometimes actually mere momentum & among whom heat, light electricity, are often spoken of as forces etc. I think we owe much of this confusion to Grove's title of his book "The Correlation of Physical Forces" & to the "Forces of Nature" so often spoken of by Humboldt in his "Kosmos".

1864 July 1. J. Haig. ... It will be time enough to decide the question you raise when we are sure (which we are not likely to be for some time) whether all heat is alike ... nor can I at all admit "the true & only question" about heat is one about the forms of the vibrations or movements of matter. Let it first be proved that heat is such movement.

1864 July 4 Admiral Smyth. ... I am now seized with a nasty bronchial affection which has now held me since the middle of January & which I suppose the Autumn & Winter will aggravate into something that people of a certain age don't get over: N'importe. Vixi & quem cursum dederat Fortuna peregi;
Et nunc magni mei sub terras ibit imago etc.

1864 July 14. De Morgan. ... which I at first thought one of my usual winter coughs & would go away. But it did no such thing & with now & then a quiet day got by taking a dose of laudanum the night before (which does not make me sleep, or has but a very slight effect in that way) I have been going about (i.e. about the house -- hardly ever able to venture out & sure to catch a fresh attack if I did) coughing hawking & all other sort of thing a mere nuisance to myself & everybody else & what is worse, unable to sit down to any serious & effective work. In fact waking every morning at 5 or 4½ & lying tossing & coughing in bed. I have found my only relief in going on with hexametrical old Homer ... altogether however the effect has been very telling on my strength & a very little exertion now knocks me up. Yesterday & today, the warm summer-like weather seems to have had some good effect & today in fact is (so far) the best I have had for many weeks.

do July 18. ... Many thanks for your receipts ... I did a mixture of oxygen & atmospheric air once or twice a, again, I thought there was some relief. I shall try it more perseveringly. [Amusing himself with enunciating cyphers.] ... My notion of an undecypherable cypher is that your cypher when read by its proper key (supposing detected) should land you, not in its English (or any other) reading but in another cypher with a different & more difficult key.

Ill health

Physical basis of language

Heat & motion (forms) pl. p. 23 29

Ill health

Ill health

doses laudanum

Oxygen

Cyphers

1864 July 18. Todhunter (re an error in 7th Edition of "Astronomy".)

1864 Aug 2. Ad. Smyth. ... somehow I do not feel quite so alert at things in general as this time twelvemonth & I quite admire your "yours in terrific haste" Things go very leisurely with me now I assure you....

1864 Aug 16. De Morgan... I do remember (as Master of the Mint) contending against the coinage of quarter sovereigns & adducing inter alia that it would cause the positive loss of a great quantity of coin. ... nor was there ever such a coin issued in my time. It is just possible that a die may have been made & a few coins struck as samples to send to the Chan: of the Exc: to be looked at, but even that I doubt. ... I have been going to write to you every day for this fortnight past, but the languor & lassitude, the utter weariness produced by this [illegible] cholitis has thrust itself between me & my resolve:

"Like feather-bed betwixt a wall
And heavy brunt of cannon-ball."

... Sometimes (as at present) for 2 or 3 days together it seems as if it were on the mend & the day before yesterday I got a walk of a mile & more, in the pleasantest temperature I ever was out in. Ditto

1864 Aug 25. W. Thomson. Accept my best thanks for your important paper on the rigidity of the Earth. I wish I were competent to enter into the evidently profound mathematical enquiries it contains

1864 Oct 21. Whewell. ... I am almost worn out with an abominable bronchitic attack, which has lasted since the middle of January & hardly ever allows me any stirring out of doors ... When it goes I fancy it will take me with it.

64.10.29.

1864 Dec 10 To Walker

TO A. BROTHERS.

I think I may very fairly claim the discovery of the hyposulphites as fixing agents - as I believe I was the first to call the attention of Chemists to that class of Salts and their peculiar habitudes especially in relation to the insoluble Salts of Silver.

My early experiments are printed in the Notices of the Proceedings of the Royal Society of March 14, 1839, in which occurs this passage in the abstract of a paper read to the Society.

"Confining his attention in the present notice to the employment of Chloride of Silver the author enquires into the method by which the blackened traces can be preserved which may be effected he observes by the application of any liquid capable of dissolving and washing off the unchanged chloride but leaving the reduced oxide of Silver untouched. These conditions are best fulfilled by the liquid hyposulphites."

cont'd next page.

To Brothers. (cont.) 64.12.29 "Twenty three specimens of photographs made by Sir J. Herschel accompany this paper - one a sketch of his telescope at Slough fixed from its image in a lens, &c.,"

This is the image above mentioned as having been taken on Jany. 30, 1839 - and I believe was the first picture ever fixed from an optical image ever taken in this country -at least I have heard of none earlier.

At the time of making these experiments, as already mentioned I have no knowledge of M. Daguerre's process further than from a mention of the existence of a process (a secret one) in a note from Admiral,(then Captn.) Beaufort sometime about Jan. 23. 1839. Of course I used paper, not silver - and it was not a suggestion but a regular and uniform practice to use the hyposulphite. I never used anything else.

64.12.4.

TO MRS. CAMERON.

I have been very careful not to read the other hexameter translations (that of Dart and Cochrane) partly for fear of being put out of conceit with my own - partly for another fear, much more important to the successful execution of my work - that of unconsciously adopting phrases or cadences of verse. When I have done it, if that time should ever arrive, I shall read them both.

Our blank verse is puny in comparison. I cannot agree with your friend Tennyson in his estimate of it as a possibly successful metre in English (mind I mean accentuated not quantitative Hexameters. Those can never succeed).

1864 Dec 7. E.W. Brayley. ... I was grieved to hear such an account of Mr Cameron's sufferings from an overdose of chlorodyne. I have been myself taking it, but am warned & shall leave it off...

... this last week I have been so exceedingly unwell as to make everything a difficulty & a burden. ... In the matter of this same "Conservation of Force"... I hold the doctrine with so very large a dash of reserve as almost, perhaps quite, to nullify my adhesion. I do not deny, I never did deny that heat is most likely a form of motion so also of Light & Electricity, but that helps us very little to understand Heat Light & Electricity further than by saving our wasting time & thought on less improbable trains of speculation. It still remains to be discovered what particular form of motion, how propagated, how governed etc. '... I have always been & still am a decided disciple of Old Boscovitch in his notions of the constitution of matter. ... As to the clashing together of atoms ... let those rest satisfied with it who can.

Annt Cousy Dec 10./64 Wallon. 1864. Dec 23. Smyth. .. I am suffering from intense & increasing bronchitis which confines me entirely to the house & for many hours of most days to my bed. & has reduced me to the last degree of weakness...

1865 Jan 29. Whewell. .... I shall send you my 14th Book. ... I shall go on (translating) if only that I am hardly fit for anything else, for I never scarcely expect to complete it as this horrid bronchitis is telling severely on my strength & I perceive the effect from week to week & almost from day to day.

1865 Jan 31. To W. De la Rue. [JTWH's description of what he considers Nasmyth's "willow-leaves" to be made of & how made.] (An exploded theory but- (perhaps shd go in ? M.F.H) See Quarterly Journal of Science April 1864. —

1865. Feb 6. Prof. Croll. At the time I wrote my paper of 1830 in Geol. Trans: the extent to which the change of the eccentricity of the earth's orbit might extend had never been so much as conjectured .... In 1842 I pointed out the influence of a change in the eccentricity on .. through its influence .. in alternately exaggerating & mitigating the vicissitudes of the summers and winters. .... (& more in defence of the above paper & Lyell) (See Feb 17th a partial retraction)

1865. Feb 22. ... To W.H. Walker ... P.S. I have got a very odd paper by a Dr Goeppert of Haarlem? on the existence of the spores of fungi in the interior of Diamond!! [He, or a Dr Vogelsang, I don't know which, sent it me per Railway and it cost me 7s 6d carriage, confound him! if I knew which it was, I would have sent it him back.]

1865. Mar 26. E.W. Brayley. When that Chapter (of Ephe Obs vol) was written I considered the Sun's surface as consisting of a transparent atmosphere overlying either a liquid or a definitely denser coating of some transparent medium upon which floated 2 luminous strata, one the bright Photosphere, another that of the Penumbra or less luminous photosphere. ... I now regard it otherwise. I consider the Photosphere as consisting of solid matter holding a position of equilibrium according to its specific gravity in an atmosphere of a very peculiar kind, viz: one which is aeriform to the utmost degree of tenuity in its upper regions, liquid where it reposes on the solid body of the sun (if there be any solid body which I think open to doubt.) And in the intermediate situations passing by gradual transition ... so as to pass through every intermediate degree of density. There, surrounded by fluid matter of their own specific gravity float (or are sustained at a definite level until disturbed by upcast, or down-cast currents and then only laterally removed) these willow leaves, rice grain entities, straw-chips, duckweed, flue, or whatever else they may be assimilated to, This view I enunciated in the Journal of Science for Apl 1864.

1865. Apl 5. De Morgan. ... I continue to be quite confined to the house, (with the exception of yesterday & the day before when there was a bright sun that tempted me out & for which I am paying today ..! in hawking, coughing & choking, and what is worse it tells upon my capability for doing anything to any purpose indoors, so that if it were not for my Homer which gives me something to do in the long mornings when lying awake before breakfast time, I should be almost entirely idle.

TO G.K. RENOUARD.

65.4.25 This is the year when Uranus completes his first entire revolution about the sun since his first discovery on March 13, 1781. I may add that my father's life just fell short of the duration of one such revolution by 23 days.

1865 May 14 Lady Lubbock (1st) I John Lubbock shall have my vote. ... I only hope he will not pledge himself too deeply & too far to the advocacy of a greatly extended suffrage & among the combining classes.

1865. July 14. Bp. of Kingston. my Lord Bishop

I am very glad to find that you perceive nothing in the two little papers of mine in the Fortnightly Review which a religiously disposed mind can fairly object to. I cannot tell why the Editor should have persisted in starting out the hostile with which I headed the latter of the two. "Mens agitat molem et magno se corpore miscet" Virg.

It is by no means now for the first time that I have insisted on the evidence from our personal consciousness as to the spiritual (?)(in the sense of non-material) origination of force.

I confess myself unable to draw any nice line or make any clear distinction between the mediate and immediate agency of a being who is present in every point of space and at every instant of time; who is cognizant of every movement and action of every particle of matter; who either once for all originally endowed or at every instant, continues to endow those particles with all the powers and properties they have; and who, either by annulling the original grant or by withdrawing his continuous authorisation has it in his power at any moment to destroy or suspend them. As to the idea of an "Eternal self-existent matter" in the sense of an independent and uncreated world, the τὸ πᾶν of the "Pantheists". I think the argument put forward in para: 28 of the "Essay on the Study of Natural Philosophy" finally and effectually disposes of it.

1865. Sep 14. Looking at the targets at the Archery Grounds at St Leonards I was scandalized to find the arrow marks apparently almost uniformly scattered over the surface ... .

H. H.

1865. Sep 14. To De Morgan ... I went to Newbury & there was the old trout-stream, & looking over the old bridge over the Lambourne there was a shoal of good large trout... There was the old Mill Tail & the place close to the Lock where as a boy I one day tumbled in. Just as it was 65 years ago. ... & the peak took us to Sevenoaks ... what a queer place!

1865 Nov 10. Sedgwick. ... I am not quite so old as you, and the state of things in general in those departments that I know any thing of now, is as different from what it was when I picked up my elementa juvenia as that of the Romans under Titus & Trojans from the Greeks & Trojans in Homer.

1865 Nov 23. W.S. Jevons. Your books on the Coal Question, it ... seemed an echo of what I have long thought & felt about our present commercial progress & the necessary decline of our commercial & manufacturing supremacy & the transfer of it to America. Longe absit. But it must come & I think you have been merciful in giving us another century to run. Such a work as yours has been long wanted to dissipate completely the delusion which so large a majority of our countrymen labour under of the "inexhaustibility" of our mineral resources & "the probability amounting to certainty" that science will ere long put us in possession of a substitute for coal. ... I have read every word of it with the avidity with which one devours a new novel.

1865. Dec 7. Lyell. [Describing the exact situation of Botzen of the "Pillars". Used as an illustration in Lyell's Principles of Geology.]

1865. Dec 14 De Morgan (Riddles)

Riddles

1866 Jan 13. Miss Collings. ... I remember once standing on the iron pipes laid down across the Steyne at Brighton when workmen were hammering at the other end. I felt every blow under my feet before the sound of the blow arrived.

1866 Jan 14. Whewell ... I have continued to get seized upon by another most savage attack of bronchitis which keeps me ... realizing ... Sedgwick's moving complaint of having become a monster unto many.

1866 Feb 16 Collins. ... My main object has been to try what can be done to wipe off the stigma cast on English Hexameters by such people as Tennyson & Lord Derby echoing what I consider a very vulgar & prejudiced outcry for which they ought to be ashamed of themselves.

1866. Apr 2. (Excitedly saddled himself together enough to get Whewell's funeral)

1866 Apr 10. De Morgan. ... Though better perhaps in general health I am still horribly weak & unnerved .... I felt Whewell's death very severely. He was one of my very earliest college friends & our subsequent intercourse was unbroken.

1866. May 5 ~~1865~~ To R. Wolf. (Observer somewhere?) ... I suppose you know that Mr Airy now gives in his adhesion to the existence of those curious bodies described as 'willow-leaves' or "ricegrains" etc, having obtained a clear and distinct view of them.

1866. July 28. Healey ... (The French Metrical System) I do not believe that that system will ever become the British Legal system to the abolition of our present standards. .. The simplicity & excellence of our present system when put with the following form of statement is very striking: ....

1866 Aug 12 De Morgan. ... I have been effectually laid up by a joint attack of Bronchitis & a nasty ailment in my left foot which took to swelling & inflaming without any visible cause. However both are now better & I can stump about the house instead of wheeling myself about in a chair.

1866. Sep. De Morgan ... Babbage was my junior at Cambridge by 1 year — That's beyond a doubt. Into that same "gulph" you speak of, no doubt he dropped, or rather jumped in like Curtius, as a fair opening for a young man, though he knew a good deal more of mathematics, at least of certain sort of mathematics (but that the wrong sort at Cambridge) than, I suspect, most of the examiners did.

1866 Sep 4. Sabine. ... as regards securing the instruments in conveyance I should recommend their suspension in the interior of cages by elastic bands or coiled wire springs, should it be required I can send the description of such a cage, which I had occasion to suggest to M. Babinet a perhaps of some project of his for measuring the force of gravity by a torsion balance ... .

1866. Oct 4. Miss Collings. " I was extremely unwell ... state of lassitude & insouciance ... I was rather annoyed at Longman's ignoring all about my Head. ... but I understand that he is the fanbearer of Dr's Hexameter version, which may explain his reticence. .. Ichabod Wright who has fallen under the lash of Matthew Arnold's heavy displeasure was an old schoolfellow of mine — Old Emerson was a very singular character. His "Fluxions" & "Increments" were among the earliest mathematical books I read, the former is little worth, but from the latter I picked up some things that I have found no-where else (at least nowhere so early.)

1866. Oct 9. De Morgan. ... as to the origin of South's squabble with Babbage I know nothing, but suppose he first took up in Davy's career when B. abused Sir H. or that it arose out of that R.S. affair. As to the latter they are at peace now. Sir J. it seems has fallen into a state of decrepitude & testified signs of speculation & they have met & B has done the good-natured [this entire nonsense which follows]. Some months ago South's brother wrote to me to tell me the sort of utterly broken-down state in which he is & that he knew it would be a comfort to him if I too would call upon or write to him & let bygones be bygones. So I wrote him a good-natured letter & have heard no more about him.

1866 Oct 13. Sir C Lyell. ... I wonder Mr Hopkins did not include in his speculation in your p. 17 the effect of breaking through both the great Isthmuses (Suez as well as Darien) This it is conceivable is not beyond human power & also as the climate of all the North of Europe wd be changed; once opened ever so little, the equatorial current would cut deeper & deeper & the two great areas of circulation in the N. Atlantic & N. Pacific would be thrown out of gear!

1866 Dec 4. C. Lyell. Many thanks for your valuable 1st Volume I am reading it with exciting pleasure & I congratulate on having turned it out finally in so telling a form. Am I not blazoned in gold! I could hardly believe my eyes to see my poor Earth pillars so transformed! The engraving is very nicely executed. To have got in the whole wd have necessitated ... a reduction of scale which would have ... spoilt the effect.

1866 Dec 10. Wm Colling. ... I have of late been much deprived of strength and energy by repeated bronchial attacks ... I was able however (very well wrapped up) to see the greater part of the great Phenomenon .. of Nov 13.14 Though it did not equal expectations formed, it was very much richer & finer displays than I had ever seen before. "Lances of the sky" as you term them were really very like lances, wreathed round with fire in the shafts but with a long projecting portion unenveloped and a deep red gleaming point (like the fire which the red star sheds in the autumn") standing out quite definite & far surpassing in brightness the line, immediately behind, connecting it with the train. The whole affair, taken in conjunction with the extremely definite circumscription of the mean point of radiation must, I think, fully satisfy every Astronomer of the reality of that ring; or more orders irregular mass of an annular character, of very minute planets encircling the Sun (perhaps not one in a million bigger than a grain of sand) And the obs^ns suffice to determine with a rude approximation their orbits, a near approach to circles intersecting the Earth's at an angle of some 18° to 20° & moving contrariwise to the general motion of all other planets. That is the truly strange & surprising part of the affair. Many suspect that this was not the great display ... the myriads of stars & fire-balls falling on all sides like the flakes of snow in a snow-storm.

1866 ... (earlier than Nov) To C. Pritchard :: I have I think broken the neck of that tremendously tough piece of work which had to be done in the completion of the Synopsis of my Father's double stars. It has occupied me the whole summer & little notion had I what an amount of down right hard work I was in for... It soon found when I came to go into the work of the identification of those whose places are given only by description & which have not been tabulated by Struve & others, that it involved a reference to & use of all the original papers, a verification in many instances of micrometrical reductions and a knowledge of my Father's & his sister's habits of work & procedure & of a multitude of particularities which ... no other person than myself could execute ... so many delicacies of discrimination & so much consideration & balancing of conflicting descriptions to determine the choice of the Stars fixed upon came up, that I could accept no other judgement than my own.

1867. Jan 27. TO LEVERRIER.

Je serais le dernier a abandonnet cette "hypotse Neb." qui, quoique denoncée formellement par Laplace dans son "Exp. du Syste du monde" avant la publication du Mem: de mon Pere de 1811 (et avec beaucoup plus de devellopement en ses application savantes aux particularités de notre Système Planet), prenait assurement son origine dans le speculations anterieurs de W.H. sur le progres de condensation dans les amas d'etoiles et de nebuleuses - desquelles le memoire cité n'était que le dernier mot, resultat definitif de longues années de travail et de meditation.

Je n'cublierai jamais une conversation que j'eus le privilege d'avoir avec votre grand compatriote dans sa retraite d'Arcueil le 29 Juillet 1821 dans laquelle il me disait, (en parlant de la condensation des nebuleuses et formation des systemes) "Il m'a toujours semble que les idees de Monsr. votre Pere la dessus sont tres philosophiques et tres vraies."

1867 Feb 2. Baxendell (On the mechanism of storms.)
1867 Feb 2. Hutton ... [On Force & atoms ...?]
Sir. W. Thomson.

1867. Feb 2. Miss E. Collins
My poor Homer meets with but scant toleration among the newspaper and weekly critics &c., - one indeed while declaring all Hexameters to be utterly abominable admits (rather a doubtful compliment) that there is no mistaking mine for anything else - another says that there ought to be attached to them a label on the principle of that affixed to a painters attempt to represent a Lion. "This is a Lion, and not a Donkey." As these dicta contradict each other, I suppose I must comfort myself by accepting the more favourable of the two - or better still by reflecting that I wrote them to please myself and not the weekly critics.

1867. Feb. 16. Dallmeyer. [my "reading glass."]
Phil. Trans. 1821.

1867 Mar 5. Babbage ... owing to the rapid and rapidly declining state of my health the circle of my correspondence & communications is narrowing from month to month & almost from week to week. ...

1867 Mar 20. De Morgan. ... I am utterly sick of this horrible season - it has taken from me all power of moving doing or thinking & gone far to reduce me to a mere coughing machine ...

1867. Apr. 25. De Morgan ... Oh! the comfort of a quill pen after those nasty steel things!

1867 Sep 30 Miss Quincey. ... The Duke of North^d recently dead was not ... the Duke who originally instituted the characteristic liberality to defray the very serious exp= ense of publishing my "Cape Observations" but a cousin of the former. The work etc The work was however not published till after the death of the former Duke and the late Duke very handsomely took on himself the fulfilment of the obligation.

1867 Nov 2. Miss Drummond. ... I always looked on him (Mr. Drummond) as something much more intimately connected with my Scientific acquaintances & associates than most of my

1868 Feb 21. Canon Selwyn. May I ask if you have got Observations of the Sun on the 16^th & 17^th inst: ... What makes me curious about this is that I do not recollect ever seeing or reading of such a sudden change from a state of prolonged inactivity to one of excited excitement in the solar atmosphere. Something very unusual is going on. I am not much impressed with the notion of Planetary Action but as Venus & Jupiter have been pulling together for some time & Mars helping them, there may perhaps be something in it. .... I was very much shocked yesterday at receiving from his nephew the sad intelligence of the death of Mr Dawes. I had no idea he was ill & was just going to write to him in re Double Stars.

1868 Mar 1st Miss Colling (a Spätzeitgang in Lolita.) ....(The same thing happened to me in the case of Maria Edgeworth) This has been a great year for the gathering up of my old acquaintances. There are Brewster and Dawes, Lord Rosse & Lord Wrottesley & Michael Faraday who never made an enemy in the course of his life. ... Many thanks for your kind enquiries about my health. During the while winter I have been a prisoner, but the registering & digesting great masses of observations of double-stars - a monotonous but not unpleasing, because interesting employment, & one that makes the hours run off very smoothly, has deprived the imprisonment of most of its désagrémens. ... I had thought of making a version of Dante in the original terza rima, and finished the first Canto - on the whole well to my own satisfaction, but it is too difficult and there are 100 Cantos.

68/3/1 It is a doctrine of mine that translations of verse ought imperatively to reproduce the original metre, and recurrence of rhyme as well as rhythm - to give - in short, as nearly as difference of language will admit - a true picture of the original.

1868 Mar 17. (To H. Tuberville. Who is he? Why did he hand his Will to the curtsey of JTWH.)

1868 Apr 18. To De Morgan. Thanks for your letter. I was longing to hear from you but have been too listless & too much in abeyance for a good while past to summon up pluck to write a letter right straight off without immediate access to anybody - not that I have been actually ill, but what people call "very seedy" a phrase I suppose that means a general indisposition to move think or speak with a kind of grumpy consciousness that it is not by any means a fitting state of mind or body to be in. [Newton & the Book of Daniel - see de Morgan's letter]

1868 May 8th Miss Colling. ... The last month has been one to me of great weakness bodily suffering & overpowering lassitude & it is only now that the 3rd glorious day of sunshine (the first unaccompanied with cutting east wind) enables me to lie out in a Summer house & suck in the breath of a good old unreformed Spring day, that I feel "the burthen of the mystery of all this unintelligible world" lightened enough to allow me to look over my portfolio and gather up ravelled ends, connecting links of thought I should grieve to see altogether broken. ... As for Dante, I agree with you in your judgement of him - The Grotesque stifles the sublime and the disgusting overcomes that naughty friendlike enjoyment of the horrible that makes more or less a part of our aesthetic nature. I began another Canto but I don't think I shall go on. Le jeu ne vaut pas la chandelle, and though the completion of anything I have once begun has always been to me a sort of vis a tergo urging me on in spite of myself, still I cannot forget there are 100 cantos. ... Walking on the water I believe to be very possible even on the Sea. years & years ago I devised a kind of machine I called a "Water-Velocipede" on which one could sit astride & paddle oneself along by float boards attached to the feet. It was a kind of 4 legged Spider with lenticular copper hollow floats for its four feet thus: The feet standing very wide apart & the saddle very low. Nothing could sink or upset such a machine, and I think it might be very useful in saving life..

1868 June 30. [To Sir Chas: Lyell on the Föhn wind.]

[marriage of Amelia & "a niece of Lady H." ? who. JTWH. went to H.H's first.]

1868 Aug 5. To W. Huggins. (Subscribe)
In the Tails of Comets ... something ... must be ... How (also) about Carbonic Acid & Carbonic Oxide &c rendered phosphorescent by the passage of electricity? (which is likely enough to be excited by friction in issuing from the nucleus as steam escaping produces frictional electricity) .....

1868 Sept 9 R. Main. ... it found me occupied making a General Digest of the measured positions & distances of all known double stars – a stupendous Opus which I shall not live to finish. ... Singularly enough (another book) ... reached me per book post ... mis-sent from Collingwood in Victoria, Australia. It reminds me of a Vol of Phil Trans:! which reached me by Post as a letter (Postage £37 if I remember right!) at the Cape misssent to Australia!!

1868 Oct 1. To T. Sabine.
... I have been looking over the papers of Dr. Brougham ... in Phil Trans: 1796, and I can make neither head nor tail of them. ... merely evidence of an early taste for experimental & Physical Enquiry. —
(See JFWH's correspondence somewhere with Dr. Br. M.F.H.)

1868 Oct 25. Langley. re 2nd Sir J. Lubbock. ... As regards Politics. I should not have allowed my name to appear on his Committee last year, unless I had full confidence in his discretion as well as in his zeal for the improvement of our institutions by the advocacy of really useful reform where needed. As well as in that general good sense so necessary to a political man in the troubled state of politics at present, to the possession of which rather than to the adoption of any party denomination I should myself be disposed to look in the choice of a representative.

1868 Oct 30 Miss Colling ... We may now expect to see Auroras pretty frequently, as the Sun is rousing himself from a rather unusually long period of inactivity & beginning to be very spotty. What the connexion is, Heaven knows – but some connexion there certainly is between the two classes of facts .... The Eclipse observations by no means turned out a total failure. They have given positive observations of several points of great interest among which not the least striking is a proof from the 'polarization' of the 'Corona' that the said Corona belongs to the Sun, in other words that beyond the luminous disc & beyond the region of the red flames there extends an Atmosphere reaching 3 or 400,000 miles from the surface on all sides. Such at least is my interpretation of the fact if verified in next year's total eclipse.

1868 Nov 16. To Sir G.A. Macfarren.
re Music (Might be quoted in part to show additional instance of JFWH's interests in Mus)

1868 Dec 2 To J. Tyndall.
... Go on & prosper! It seems to me very clear that you are on the high road to something very remarkable....:

1868 Dec 14. To J. Tyndall.
... I am delighted with the way you have followed out this most curious & interesting problem & verified so completely my prediction that the true explanation of the blue colour of the sky would be found to carry with it that of the polarization of sky light. You have made it clear I think that they are part & parcel of one & the same ultimate fact... which is... allied to chemistry ... and analytical dynamics .... but which it will require a good deal more of experiments in such hands as your own to present in a perfectly definite & intelligible form. P.S. How about the blue colour of water? Does that too arise from disseminated particles? or is the blue colour absorbtive?

re Mrs Somerville's M.S for her autobiography. To J.B. Pentland 69.2.7.

Before I commence its perusal I would wish both our dear friend and yourself, as her intimate and trusted and daily increasing friend to be made fully aware that in my present circumstances of exceeding prostration of bodily health and strength, and langour and sluggishness of mind. I cannot possibly enter into any detailed correspondence on particular points which may arise in its perusal, still less to add any note or comment on particular passages. Even the reception and revision of proofs sheets and that kind of editorial supervision which they involve, must be trusted to other hands. In fact I cannot answer for myself from day to day.

1869 Mar 14. - Mrs Somerville. It is now more than a month since I have been in possession of the M.S of your autobiography & I ought to have written to you before, but for two reasons, the first I am compelled to say, has been that state of langour & depression both of bodily & mental activity which deprives me of the power almost of doing anything calling for consecutive thought or giving anything its due attention be it ever so pressing, the other my anxiety to do true & faithful justice to the confidence you have reposed in me .... Pray understand. ....

previous:

Pray understand, that I do not dispute Adams' priority, now that all is known. At first, I was inclined that way. But it was so near a race, the parties so entirely ignorant of each others proceedings - and Leverrier attacked this problem from the very commencement so radically, and in so masterly a style, that I am not surprised that his compatriots feel a certain reluctance to hand over all the fame and glory of the thing to his rival. If ever there was a discovery bona-fide equi-claimable, it is this.

.... You are probably not aware that there is a very bitter controversy now in progress as to priority of invention of the Electric Telegraph between Mr Cooke & Sir C. Wheatstone would it not be better to steer clear of this subject? .... You do me the unmerited honor of assigning me classical distinction at Eton. In point of fact I was at Eton as a very little boy for some two or 3 months, but my classical studies there were confined so far as I can remember anything about them, to the accidence & "Propria quae maribus" in the "first form" above which I do not think I ever advanced. ...

Mrs Calling 69.5

But one of the most remarkable effects of last years heat was the production of ripe seed-cones or knosps full of seeds from a Wellingtonia (the first instance I presume in England) which was planted from a pot in 1858 and is now 23 feet high.

... I assure you I have been quite as much scandalized as you can possibly be with the rubbish, for I can find no better name which under the name of Poetry has of late been thrust into the face of the public by our Laureate etc. .. It was in the year 1850 that travelling in France among the volcanoes. (see Sir. H's Diary.)

1869. May 11. De Morgan. Hoddesdon ... In the end of September I caught from almost no exposure) a cold which rapidly passed into furious Bronchitis & lasted me all the winter & into Jan: Feb: & March. The warm weather has for the present however driven it away, but the very slightest exposure sets me off again into the old premonitory swelling of the throat-glands & the outburst of a fountain of living waters from the eyes nose & mouth. I only keep it down by laudanum (a small dose every night) which so sure as I intermit for a single night, so sure I am to be sneezing and coughing & spluttering next day from about 1 p.m in the most regular way imaginable. It is very odd! but it has left me in a state of excessive bodily weakness & the grasshopper is a burden, accompanied with indolence & dawdling, novel reading etc etc & going to sleep in an armchair at tea-time

1869 May 30. to J. Tyndall.
(The 6 fold tail of the 1744 Comet.)

69.6.28..71. June

TO MISS E. COLLING.

The Bicycle is becoming a useful article. My Son aforesaid makes nothing of using it as a horse (along a very hilly country) and goes about to great distances - the other day he returned from paying morning calls after traversing 22 miles of country (not tired at all). There is danger of breaking an ankle - but this (after one or two slips, warning him of the danger) he has obviated by a very simple and easily added contrivance.

1869 June 28 Miss Colling. The bicycle. "I have been trying Browning (Sordello) and confess myself beaten by his unconstruable sentences. Even as explained by his running "interpretation" at the head of each page I am forced to admit that I cannot make out the meaning of at least 5 lines out of every 10.

1869 A draft of a letter to General A.H. Gordon.

1869. June 4. J. Haig (On Philosophy or The Science of Truth.)

1869. 6.4 Coffee Evans.

I regret to say that owing to my enfeebled state of health it will not be in my power to attend the Meeting of Visitors to-morrow at Greenwich - which I beg you will have the goodness to explain to the Board.

At the same time I will take this opportunity to observe that as I see little prospect - from the same cause - (advancing years and increasing bodily infirmity) of being able to give that attendance on future occasions which the duties of a visitor require. I should wish that their Lordships of the Admiralty would replace my name on the list of Visitors by that of one more able to fulfil them.

69.6.16.

TO A. SEDGWICK.

To think of your going and scrambling up precipices and plunging into Devils Punch bowls and getting sprained ankles and getting them cured and lecturing away for a 52nd. course at 84. Why, here am I, a chicken in comparison, and can hardly drag one leg after another and can do nothing but dawdle and dream and read novels and travels and "Literature" as it is called.

~~1869. June 9. To Henry Cook.~~

1869. June 16. Sedgwick. [Suggesting a selection of books for young mineralogist.]

69.6.19

TO B. JONES.

~~My dear Sir,~~

1869. June 19. To B. Jones.

I grieve to say that I can only be present in spirit at the meeting of Monday, the state of my health being such as to have precluded my leaving home for many months, most anxious though I should naturally be to shew every possible reverance and honour to the memory of such a man as Faraday, whom I have always regarded as the μεγιστος ανηρ of British Science - so clear and far-reaching in his views, so indefatigable in their pursuit, so single in his objects, so blameless in his life, so genuine, candid and unaggressive in all his relations with his brother savans.

Sein Leben.
Liegt faltenlos und leuchtend augebreitet
Kein dunkler Flecken bliebt darin.

I think his Royal Highness has shewn excellent good sense and feeling in presiding at such a meeting which I wish it were in my power to attend.

1869. 7.1. De Morgan

As far as mere weakness goes, I can re-echo your report and I shall be very glad to be able to talk of walking half a mile as a proof of it.

69.7.22. July

TO A. De MORGAN.

I don't know how the last week of furnace weather may have suited you, but it has eaten a great hole in my strength coming so suddenly after a long spell of cold.

1869 Aug 1. To R.A.Proctor (end of this letter already extracted.)

... Your promised paper on (the community of Proper Motion of stars over large regions) cannot fail to be highly interesting. I cannot say that I am at all surprised at its being found that the average proper motion of Stars of small magnitudes is not less than of large, considering (as I have always done) that the range of individual magnitude (i.e. distance) must be so enormous that multitudes of very minute stars may be in fact our very near neighbours.

.... A remark which this connexion (the Globular Clusters with the Milky Way? W.H.) and the structure of the Magellanic clouds has often suggested to me, has been strongly recalled by what you say of the inclusion of every variety of Nebulous or clustering form within the Galaxy - viz. that if such be the case i.e. if these forms belong to a form part & parcel of the Galactic System, then that system includes within itself, miniatures of itself, on an almost infinitely reduced scale & what evidence then have we that there exists a universe beyond? - unless a sort of argument from Analogy that the Galaxy with all its contents may be but one of these miniatures of that more vast universe & so on ad infinitum - & that there may be in that multitudes of other systems on a scale as vast as our galaxy, the analogues of those other nebulous & clustering forms which are not miniatures of our Galaxy ?

I hope you will not be deferred from dwelling more consecutively and closely on these speculative views by any idea of their hopelessness which the objectors against "paper Astronomy" may entertain - or by the real slenderness of the material, threads out of which any connected theory of the Universe (at present) has to be woven. Hypotheses fingo in this stage of our knowledge is quite as good a motto as Newton's non-fingo - provided always they be not hypotheses as to modes of physical action for which experience gives no warrant.

69.8.21.

TO T.R. ROBINSON.

My own state of health altogether precludes me from all hope of attending any more of these exciting gatherings.

69.9.11.

TO De MORGAN.

Thanks for your enquiries. As to thriving I can't say much. I caught cold by leaving off a flannel waistcoat at night one of those frying hot nights in August and it is settled down (I fear for good and all) into the old Bronchitis worry. Also I have within these few days had a recurrence of what I call - Blind Gout - but a sullen angry swollen dem-podagrous sort of thing enough to cripple one effectually but not beyond ordinary patient endurance.

1869 Sep 20. To W. Huggins.

You may perhaps remember my suggesting as worthy of a trial in the event of a bright Comet appearing in a favourable situation the application of your spectroskopic (sic) process to ascertain its velocity of approach to or recession from the Earth. We may have a long time to wait for a good comet, but meanwhile Mercury in its quadratures with the earth as seen from the Sun offers a very favourable object for the trial.

Sep 22 To W. Huggins.

... I cannot imagine how I came to make so silly a blunder, of course the situation of Mercury when approaching or receding most rapidly to or from the Earth is not at its points of quadrature (seen from the Sun) but at its greatest elongation from the Sun as seen from the Earth ....

69.10. .

TO T. FOWLER.

I have been extremely unwell for the last fortnight, and have been unable to read with anything like the attention requisite.

69.10. ..73.

TO W. HUGGINS.

The extreme state of bodily weakness under which I have been for some time past labouring and which I find day to day rapidly increasing, brings with it as its unavoidable accompaniment a certain amount of mental lassitude and indisposition to grapple with any considerable fresh mass of intellectual work.

69.10.23.

TO W. SELWYN.

Being occupied with the very prosaic work of compiling a general collection of all the measures of Double stars which I can find in published works. It runs out to an immense extent and I have no hope that I shall live to complete it, but shall at all events leave it in a state of considerable forwardness for some one else to complete.

69.10.25.

TO MISS E. COLLING.

The pleasant warmth of the later part of the summer has in some degree relieved the pulmonary annoyance under which I had been suffering but I expect its return with the first decided pinch of winter.

1869 Nov 24. R.C. Phillips (On Music.)
1869 Dec 19. To Mrs Jones. (In extenso ?)
1869 Dec 20. H.S. King. Thanks for Mrs King's volume of poems... In one of them "The Week in July (Tuesday) I was quite

I was quite delighted to find a practise of my own which is a great pleasure now and will I dare say some day prove one of comfort and relief turned to such excellent account. I mean the use of a little hand-looking-glass as a bed companion. I pass much of the night waking and the head of my bed is precisely towards the window - and in the long dreary nights - to be able to see the stars when there are any - or the moonlight - and to watch the breaking day without rising and turning is a real comfort. I shall never do it in future without thinking of that bed-ridden old man.

70.1.13.)

TO MISS COLLING.

Winter has of late been always very hard upon me and condemns me to close imprisonment.

[Week in 1852 to Stars got letter to HHH Cameron at E. Sheen.]
1869. Feb 16 to HHH. Cameron [Letter to a young man of 18. ??]
1870. Mar 13. R.S. White

The fact is that (I believe in common with not a few others) I have long seen with much regret the large and increasing prominence which is given to Boat-racing, athletic sports, and similar subjects of juvenile competition in our universities and public schools as obtruded on the notice of the public in the daily papers - competitions involving a devotion to training, and diversion of attention beyond what I think due to the intrinsic value of the acquirement, and which in many instances have the evil effect of supplanting more serious and important pursuits, and defeating the principal objects of university education.

70.4.1.

TO.....

To R.A. Proctor.

I hope you will forgive this kind of maundering. I am suffering under such a dreadful infliction of Bronchitis (caught by planting 8 Crocus bulbs on what seemed a fine day in the beginning of March), that I can scarcely move, write, or think consecutively.

70.4.2.

TO.....

To De Morgan.

I am just beginning to breathe again after a fortnight or 3 weeks all but suffocation with an attack of Brown-creatures brought on by going out one seemingly nice enough day and planting 8 Crocus bulbs. It has brought me down to the last extremity of weakness, so as hardly to be able to drag one foot after the other - and everything seems going on as in a dream.

1870 a/p 9. v. Haidinger ... This history brings forcibly to my recollection the sporadic Lewesian movement, and as it were awaking as from a long torpor of a number of young & ardent spirits at Cambridge in the early years of the present century, who, struck by the neglect of the higher mathematical studies then prevalent resolved to make an attempt to revive a taste for a more effective pursuit of them by the establishment among ourselves of an "Analytical Society" & the publication of a series of Memoirs, the 1st Volume of which actually appeared. The mention in Pg

[Meteoric Iron & Homer ?]

The mention in p. 87 of the Superb Platinum and Magnesium Cyanuret prepared by Herr Quadius brought to my remembrance a most beautiful specimen of that Salt which you had the goodness to send me, now many years ago. It is now before me in the delicate little square bottle in which it came - and has lost none of its astonishing brilliancy - the vivid green reflections contrasting as strongly as ever with the full red colour of the Salt.

1870 June 15th Miss Colling. "(about a toad) ... I read some poetical effusion, I wish I could recollect it. Two scraps of Poetry escape my recollection, but this is gone "into the empyrean blue". ... As to Swallows found in ice there is a certain amount of evidence for it. I know that I have read a paper about their being found in ice dragged up from the bottom of a running stream. ... Apropos of Toads, we had a Toad that haunted a spot in our garden. So I caught him & wrote on his back with nitrate of silver "My Toad Jack" & turned him loose in the Sun. Unluckily I have never seen him since.

1870 July 31. Miss Colling ... There has been a great meteor fall in Tripoli .... Alas! Alas! a Bombardment of a very different sort is probably going on now on the Rhine ... It is too painful a subject to dwell on.

1870 Aug 18 Miss Colling ... Many thanks for Dr Sotting's Translation of the Wacht am Rhein" How did he acquire so much English as to do this? Dr Spurgeon's Sermon strikes one as rather bizarre than effective. France is paying an awful ~~price~~ penalty for the tremendous blunder of her Caesar! There appeared in the Times a day or two ago the German in full length of: "Sie sollen ihn nicht haben" etc. I knew only the two first lines of it & the "Refrain" & was very glad to see the whole of it, which I forthwith rendered, for better for worse, into English as over leaf. ... .

1870 ~~Aug~~ Sept 4. Canon Selwyn. ... What an astounding piece of news that of last night!!! This last fortnight has been like a horrid dream. It seems impossible not to pity the fallen Emperor, whatever his fault.

1870 Oct 16. J.P. Garnett ... Bless these cards, they are like talking to one's friends

(? When were postcards introduced??)

1870 Oct 19 Miss Colling [Rock seen & inverted arches]

1870 Nov 4. Miss Colling [Poetry may be called the Music of Thought] with RS

1870 Dec 22. To G. B. Airy.

P.S. Re "Astatic Needle". I have never been able to find where Nobili's Astatic Needle was first described nor the date.

I think I may claim to have been if not the first (Nobili being reserved) at least an early & independent inventor of it. See my & Babbage's paper on Arago's experiments in Phil: Trans: 1825 where the absolute neutralization of all external magnetic influence as well as of all directive power in the bars themselves was secured by the contrary action of magnets (set thus) & as instable to exact neutrality by a more or less obliquity on the revolving plate.

The use of 2 contradicting magnets thus (2 needles stuck across a straw) was not long after suggested by me to Mrs Somerville on the occasion of her magnetization of a needle by the violet rays of the Spectrum & I had forthwith an apparatus in the nature of a torsion balance (thus) carrying two equal or nearly equal magnetized bars oppositely place (thus) & each capable of being tilted by a slight amount of rotation in a vertical plane so as to allow of the precise adjustment (by weakening the directive power of the stronger) to neutralize each other's denied effect — with the object of exploring the magnetism of not only Nickel & Cobalt but of all other substances — Unluckily the experiments (for want of time & other work on hand) were never carried out. Had they been so the phenomena of Diamagnetism could not fail to have come under notice. —

1870 Dec 25. Dallmeyer. ... by a very careful trial (looking through 2 pinholes at a distant object) I find the distance of my optic axes to be 70¿, 30ths of an inch or 2·35 in. The distance of the centers of the eyeglasses in your glass is 77/30ths or 2·57in.
your letter. 1870. 12. · (re Wheatstone)

It is one thing to say that a really good life of such a man as our late lamented friend, would be a desirable acquisition to our literature - quite another to suggest how it should be written and who should write it. Such a life to be at all worthy of its subject could only be undertaken with any chance of success by an author of a range of literary and scientific acquirements in some very considerable degree commensurate with those of its subject and who should be able to devote to it a very large share of his time and attention as a labour of love. Much too would depend on whether among his MS. in detail or in the form of suggestions of new views in particular departments carried out in correspondence with friends, there exist such materials as it is likely had he lived he would have worked up to something of sufficient importance to bring together in a posthumous form. Among his numerous letters which I possess I do not think there is much of this nature, though all that I have with some very few private ones will readily be placed at the disposal of any competent editor who may be entrusted with their selection. But I would warn such an editor to take care and avoid the stumbling block into which the Editor of Faraday's life fell in printing a great mass of letters that add little to the interest of the work either in ... (breaks off here.)

71.1.14.

TO W.J.M. RANKINE.

I beg to thank you for your Paper on the Thermo-dynamic theory of waves which I received some time ago but have since been too unwell to acknowledge.

I am sorry that its analysis is quite beyond my calibre, but I ought rather to rejoice that the views of investigators and the resources offered by modern improvements have carried them so far in advance.

1871. Jan 26. A.Ermann. ... May I venture to draw your attention to a point which has deeply & indeed painfully interested me. I allude to the systematic attempts made of late years ... to introduce a total & as it appears to me, a subversive and suicidal change in the very inmost life of the language. ... So long as an individual author chooses to disfigure his own writings in his own books in this way, it is a simple instance of bad taste. But the case is different when a great National Academic body in its publications admits & in so doing affords its sanction to, such a system. It will ill inaugurate the new future of "United Germany" to begin by striking so deadly a blow to that grand Language which has become the common & valued property of the whole human race & is too sacred & too venerable to be so tampered with and defaced.

Excuse me if I express myself warmly for I really feel in reading such things a sense of outrage on all early philological associations. It is a sort of breaking off from the past - a cutting adrift from all that binds the present generation to those which have gone before & rending all those memories which Etymology links on to words.

71.1.31.

TO MISS E. COLLING.

Many thanks for your kind enquiries. I am as well as can be expected of a man just entering on his 80th year under the exhilarating influence of persistent Bronchitis and a most savage winter, having become to use the expression of a good old friend similarly circumstanced "a monster unto many" - keeping up a perpetual barking to the annoyance of all around me.

I shall be very glad to see Dr. Solling's pamphlet though I fear I shall sympathize but little with Prussian exultations. Had they stopped short at Sedan, secured Metz and their coveted Alsace, and thrown the onus thenceforward on the French - there might have been ground for exultation. As it is, they have openedayawning abyss before us, too dreadful to contemplate.

1871. Feb 2. R.A. Proctor ... I have at length completed a Catalogue of Double Stars for a Common Epoch

1871 Feb 7. R.A. Proctor

All my Father's portable telescopes were on the Newtonian Construction. Those with reflectors above 12 inches aperture Front view, the reflector of 18 in. aperture and 20 f. focal length which he used in his Sweeps and I in mine both in England and the Cape were "Front view" and though I dare say some imperfection of definition must have arisen from this cause yet there is abundant proof from the separation of "Vicinissimae" double Stars, and the selection of minute companions which had escaped Struve's notice that in good atmospheric circumstances the performance was excellent of course the eyepiece was at the side and the head kept as much out of the way as possible. This refers however only to the 20 ft as I remember it to have been used. In the earlier years of its history I believe it was used as a Newtonian.

1871 Feb 9. Miss Colling. I return you with thanks .. Dr Solling's letter .... Is it really true that the mild & much enduring Germans during 3 centuries have "never uttered the word 'revenge'"? I venture to doubt it. ... That the Prussians now will be only too glad to forget & forgive if France will but do its so, I can well understand (Dr Solling) He seems much astonished that we in England should anticipate some thing of a vindictive sentiment as likely to harbour in the French bosom. We have the experience of Irish unforgetfulness & unforgivingness.

1871. Feb 17. J.P. Garrett. ... I must say I should not feel very confident in recommending the Royal Society as a body to take on itself the duty of working any permanent Scientific establishment [Kew observatory] Its sphere of action as a scientific body seems to me that best of promoting & encouraging science in all its branches by the reception of memoirs & their publication, by the adjudication of their Annual Medals by their Meetings & discussions keeping alive a spirit of Scientific enquiry & by their recommendations when appealed to on distinct points.

71.2.22.

NOTE BY DR. ANDREWS. re Herschel's Ice-Calorimeter [see further notes]

The note which I had drawn up was immediately inserted in the Annalen. Prof. Poggendorff very kindly sent me a printed slip in anticipation of the publication of the number of which I enclosed a copy to Sir J. Herschel. It is to this note he refers when in his letter of April 13, he remarks that the paragraph is all that could be wished. It gave me sincere pleasure to have been able to gratify Sir John Herschel on this occasion, more particularly as the last letter was written a very short time before his death. The hand-writing is feeble and tremulous, confirming his own statement that he was almost incapacitated by illness from writing at all.

1871. Mar 22. Miss Colling .... I'll as the French are now behaving I cannot sympathize with his (Dr Sollings) notion of killing them prospectively after pommelling them so very severely retrospectively. Alas! Alas! They will need no foreign disciplining of that sort if they go on as they are doing. .... The account of the earthquake is very interesting ... I never myself experienced even the slightest movement of the kind. This seems to have been a pretty considerable one & really I cannot help thinking they are becoming more & more frequent & extending further Southward than has hitherto been usual.

I should not have allowed your obliging letter to have remained so long unreplied to, but that I have of late been so very severely handled by the inroads of my old atmospheric enemy as to make me put off from day to day everything that could possibly be deferred - which I pray you to forgive ~~and~~

1871. Mar 25 To A. Ermann (122 Friedrichstrasse Berlin) [Sending £40 to him as a Joint Com^n with J.J.W.H. for?, with Petersen of Kiel. But: Ass Com^n for?] ... I have been & I regret to say still continue too seriously indisposed to be able to give full attention to the scientific part of your letter of the 2^d ... .

71.4.7.

TO F. HOWLETT.

I regret that I cannot offer my direct aid being at present in a state of such extreme suffering and debility from a long and most severe attack of Bronchitis as quite to incapacitate me from undertaking anything involving thought or application and in fact such as to render the smallest exertion mental or bodily difficult and painful.

71.4.13.

TO DR. ANDREWS.

Excuse my writing briefly as I am suffering under so severe an attack of pulmonary complaint as almost incapacitates me from writing at all.

71.4.13.

TO W. ACKLAND.

re Mr Newman's Tables.

But neither name nor date occurs to me, and I am sorry to say that in my 80th year, my recollection of particulars of this kind is anything but vivid.

1871 Ap 15. Miss Colling. ... The two stanza's of mine to which you allude have this peculiarity, viz: that they introduce embody a quite novel idea, that of introducing alternate Rhymes into English Hexameter & Pentameter verse, an idea which certainly never had occurred to me previously & which drew forth the admission from a critic most hostile to the "English Hexameter" an admission that so modified the Classic Elegaic form of verse might be tolerated. I have several times waked with verses 'sleep-indited'. On one occasion a long improvisation in song poured forth (as it seemed) with a richness & volume of voice quite astounding, but though sure that they formed only the last portion of a very long canticle, four lines only survived:

I'll hear no more of slavery
I hate the very name
But yet I'll bear with bravery
My portion of the blame.

Our French neighbours are certainly showing themselves forth to mankind in a very unenviable point of view & doing all they can to justify Dr Solling's bitter expressions about them.


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